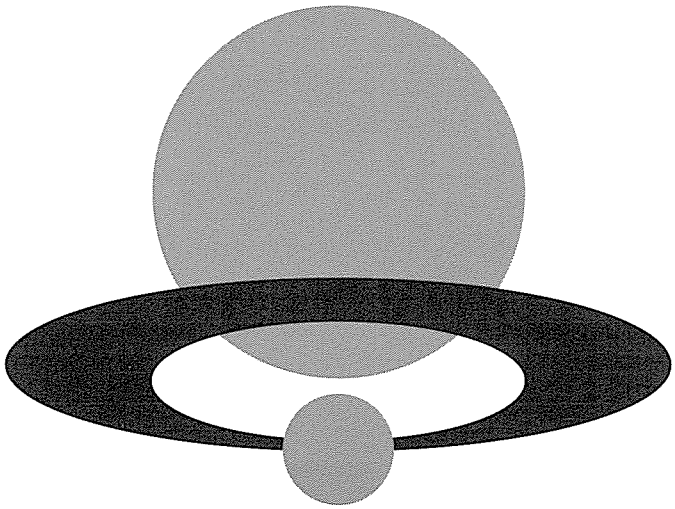
The 35th JAIF ANNUAL CONFERENCE

ABSTRACTS

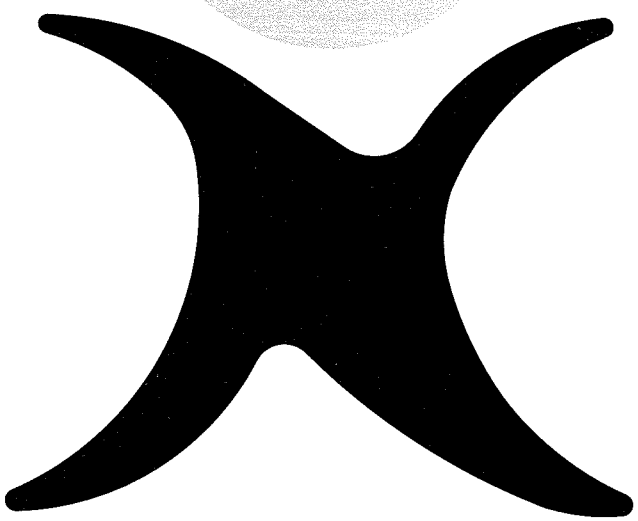


April 22～24, 2002

Omiya Sonic City, Saitama, Japan

JAPAN ATOMIC INDUSTRIAL FORUM, INC.

Get'em healthy, Nature and People, Get Energy with Electricity.



Every one of Toshiba's engineer is enthusiastic sbout creating an enviroment where individuals can live meaningful lives in comfort and abundance.We have directed concerted efforts to the development of **nuclear power** as a stable energy source for the 21st century.
The basic principle of Toshiba's Nuclear Energy Division is respect for humanity. This inspires us to devote ourselves to ceaseless technical advances that contribule to the realization of a better environment and the development of society.

TOSHIBA

TOSHIBA CORPORATION
POWER SYSTEMS & SERVICES COMPANY
NUCLEAR ENERGY DIVISION
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http://www3.toshiba.co.jp/power/index.htm

第３５回原産年次大会 予稿集変更点一覧 (Changed Point List for Abstract of Papers)

項目 (item)	変更前 (before change)	変更後 (after change)
開会セッション	大会準備委員長講演 末次　克彦	大会準備委員長講演 末次　克彦「21世紀のわが国原子力の課題と展望」
Openning Session	Lecture by Chairman of the Preparatory Committee Katsuhiko Suetsugu	Lecture by Chairman of the Preparatory Committee Katsuhiko Suetsugu "Challenging Issues and Future Perspectives of Nuclear Energy Utilization in Japan for the 21st Century"
セッション１午後	発表順: 1. N.アスキュー　2. P.ハウク　3. L. ボルショフ 4. B. コンビ　5. 南　直哉	発表順: 1. N.アスキュー　2. P.ハウク　3. B. コンビ 4. L. ボルショフ　5. 南　直哉
Session 1 PM	Presentation Order: 1. N. Askew　2. P. Haug　3. L. Bolshov 4. B. Comby　5. Nobuya Minami	Presentation Order: 1. N. Askew　2. P. Haug　3. B. Comby 4. L. Bolshov　5. Nobuya Minami
セッション２	下平尾　勲「地域振興から見た電源立地－消費地と生産地の共生について」	下平尾　勲「大都市消費地と地方の電力供給地との共生」
セッション４	Ｊ．メリフィールド	Ｊ．メリフィールド　「現在の社会経済環境における原子力安全規制」
Session４	Jeffery S. Merrifield	Jeffery S. Merrifield "Regulating Nuclear Safety in Today's Socio-Economic Environment"
２４頁	B.コンビ「環境保護主義者の観点による原子力について」	B. コンビ「環境保護主義者からみた原子力」

[Opening Session]

Challenging Issues and Future Perspectives of Nuclear Energy Utilization in Japan for the 21st Century

Katsuhiko Suestugu
Secretary General
Asia-Pacific Energy Forum

(Chairman of the Preparatory Committee of the 35th JAIF Annual Conference)

1. The problems and future perspectives of nuclear energy utilization in the 21st century
2. How are we going to get out of the current stagnancy?
   - Issues must be addressed and solved to reschedule our nuclear energy program and select nuclear fuel cycle policies.
3. Rebuilding the social relationship related to nuclear energy is deemed necessary.
   - Conflicts between areas of electricity production and consumption — We must rebuild the relationship between the metropolitan area and local communities where nuclear plants are located.
4. How should we proceed with the nuclear energy utilization in this time of environmental protection?
5. Nuclear energy and the current age of competition.
   - How should we deal with the back-end issues?

Energy of the 21st Century and Nuclear Power

Naoya Minami
President, The Tokyo Electric Power Co.,
Chairman, Federation of Electric Power Companies

1. The Century of Environment

-- Human activities seeking prosperity and growth bring forward a fundamental question in their relationships with resources and environment on the earth. The 21st century is a crucial time in guiding the future of mankind and civilization.

-- Of the burdens to nature caused by expanding human activities, the most serious one would be global warming. The emissions of carbon dioxide are rapidly increasing after the Industrial Revolution. If we take human history as the x-axis of a graph, the line would continue to move horizontally for quite a while, then it would suddenly rise up at right angles.

-- The mechanism of global warming has not been completely clarified, and it is a fact that a significant change has occurred in a very short period of time, although this may be an excessive sense of crisis. We know intuitively that we can not afford to let the line rise up forever at right angles.

2. Energy as a Key Issue

-- Modern industrial civilization, which is based on the use of large quantities of fossil fuels, has brought great many benefits to people, but it has also caused a rapid increase in energy consumption and carbon dioxide emissions.

-- Energy consumption per head in a developing nation is roughly one tenth of that in a developed nation. One third of the world population have not enjoyed the benefits of electricity.

-- It is estimated that the world population will exceed nine billion around the middle of the 21st century. The increase in population and the desire for economic growth in developing countries will inevitably expand the demand for energy.

-- Fossil fuels contain restrictive factors in themselves. Although we

should estimate the quantity of proved reserves and the reserve production ratio with considerable latitude, it is nonetheless true that the limited global resources would be used up in an instant in the perspective of a long history of the earth.

-- It is necessary to aim at the shift from a "throw-away" society of mass production and consumption, to an energy-saving oriented, "recycling" society.

-- As for the energy supply side, it is essential to incorporate a compound energy supply system, in addition to the carbon cycle.

3. Implications of Nuclear Energy

-- As an energy supplier, I believe that in the foreseeable future, only nuclear power can supply necessary energy while meeting the restrictive conditions required by the earth. Nuclear power produces a large quantity of energy, independent of the carbon cycle. From the viewpoint of the LCA, nuclear energy is superior to natural energy.

-- The world nuclear power generation of 2,400 billion kWh is equivalent to the oil consumption surpassing the output in Saudi Arabia, reducing the carbon dioxide emissions resulting from the same consumption.

-- It is possible to recycle nuclear energy. It has a potential to bring about super long-term sustainability by combining it with FBR in future.

-- We should pursue the possibility of natural energy, but such energy is obliged to remain a complementary role. The hydrogen energy cycle is hopeful in future and there is a possibility that nuclear power will be used as the energy for producing hydrogen.

-- Nuclear power is no doubt an indispensable option. We should pursue a new possibility, while spending the next decades using the mature nuclear technology based on light water reactors (LWR).

4. Toward the Revival of Nuclear Power

-- I am encouraged by a new indication toward the revival of nuclear power in the United States and Britain. Nuclear energy has also been developed steadily in Japan.

-- However, there is still a strong criticism against nuclear energy. Major factors causing uneasiness about and criticism of nuclear energy include the concerns over safety and processing/disposal of nuclear waste.

-- Not only we should do our best to reduce the risks and solve the

problems inherent in nuclear energy, but also raise the discussions widely in society on the roles that nuclear energy could play, in the face of the crisis involving the future of human civilization.

-- How should we realize a sustainable growth? If we say "No" to nuclear energy, what viable alternatives could we have? To discuss the issue squarely while arousing domestic and international public opinion, consider it thoroughly, and seek the answer – isn't this the responsibility of those currently concerned with nuclear energy?

-- I expect that the new sign will turn people's eyes to a fair appreciation of nuclear energy and it will become the beginning of a current toward a big change. I would like to join forces with others in order to accelerate this current and make it wider and more certain.

[Session 2]

Issues discussed in a consumption venue of electricity

Hiroshi Iwaki, Deputy Mayor, City of Saitama

1. Making Saitama a city that coexists good natural environment
The future of Saitama is expressed in the city motto, "Creating a leading 21-century city that facilitates wide-range regional exchange, comfortable life style with affluent culture and much greenery." One of the basic goals of citizen's life is to create a city that coexists with good natural environment.

2. Concerns expressed in the questionnaire survey of environmental problems
Last year, a survey was made to find out concerns about environmental problems among citizens, elementary school students and entrepreneurs.
I would like to introduce an outline of the results.

3. Measures for energy conservation
According to the Saitama City Action Plan against Global Warming that was adopted in the fiscal year of 2000, we will promote every possible way to conserve energy including electricity.

4. To deepen understanding
As a consumption venue of electricity, what we have to do is nothing but conserve electricity. At the same time, it is necessary to obtain a correct understanding of general energy problems.

[Session 2]

Issues between Power-consuming and Power-producing Areas

Masazumi Saikawa
Mayor of Kashiwazaki City, Niigata Prefecture

— The person who rides in a palanquin, the one who carries it on the shoulder, and the one who, in his turn, makes the straw sandals for the carrier —

1. From the "petroleum" to "nuclear" town; the one hundred years' history of Kashiwazaki in the midst of bitter struggles.

2. Construction is over. Yet, local people still continue to waver.

3. Nuclear power generation: Is it a trump card or a good-for-nothing?

4. The Japanese and nuclear energy: the hatred between those close relatives.

5. Yet, electric power is used unsparingly even today especially in metropolitan areas.

6. And, what I would like to say today ...

[Session 3]

Why do We Proceed with Plutonium Recycle?

Toshiaki Enomoto
Managing Director, Tokyo Electric Power Co.,

1. Importance of Nuclear Power for the Utilities

○ Theme of Electric Power Business: Simultaneous Achievement of the Three E's; Energy (stable supply), Economy and Environment

○ Best Mixture of Energy Sources - taking advantage of the features of nuclear power-

① Stability of fuel supply

② Long-term stability of generation cost, which is also competitive with other power sources

③ Quite little emission of greenhouse gas

⇒ Importance of nuclear power is unchanged, even in the liberalized market.

2. Nuclear Fuel Cycle

○ Enable Extremely Long Use of Nuclear Power

– FBR and related fuel cycle system is the most reliable option which can solve the problem of energy resources and long-term energy security.

– R&D for domestic establishment of nuclear fuel cycle began at the very early stage of nuclear technology development, and it takes still time to be completed.

The long-term direction of R&D should be maintained.

– Challenge to building of energy civilization by nuclear power

○ Rokkasho Reprocessing Plant (RRP) and use of MOX fuel in LWRs are the important first step to establishing nuclear fuel cycle, and they should be steadily progressed.

– Not many commercial reprocessing plants will be constructed in this country, considering its capacity. The technology development process should be different from that of LWR, which is matured by many plant constructions.

⇒ It is effective for establishing commercial-based reprocessing technology in time to accumulate experiences through construction and operation of RRP, and make maximum use of them.

– The portion of fuel cycle is small in nuclear power generation cost. Cost of nuclear fuel cycle is not large, considering as well its purpose of obtaining long-term energy security.

Strategy and Perspective on Plutonium Utilisation , including the concepts of Advanced MOX Fuel and future Nuclear Energy Systems

Jacques Bouchard
Director of Nuclear Energy Division, CEA, France

World wide energy consumption is expected to double over the next 50 years. If there is no major change in the trend, this growth should quickly cause depletion of fossil fuel resources, a dramatic increase in the contents of greenhouse effect gases and a serious supply risk for many countries. Beyond energy savings and the development of renewable energies, nuclear energy can provide a sustainable solution to these increased needs.

This is the context in which the CEA is developing its nuclear R&D strategy for the future. One objective is to optimise and develop the current nuclear facilities : R&D for nuclear energy should increase the competitiveness of existing nuclear facilities, further improve safety. Pressurised water reactors are expected to become even more competitive in time with the new reactor designs (EPR) and the life extension of existing power stations. In the French policy, PWR are, today, playing a key role in Plutonium utilisation. This role will be enhanced in the future and CEA is studying different options allowing to stabilise plutonium stockpile though multirecycling in PWR thanks to new subassemblies.

On a longer term, the objective is to prepare and assess new generations of nuclear energy systems. Water reactors only consume 1% of the initial natural uranium and irradiated fuels still contain 96% of energetic material ; they also have a limited turbine efficiency. Fast neutron reactors have intrinsic advantages ; they are capable of making use of the entire energy potential of the uranium and drastically reduce the high level and long lived waste. They have been thoroughly studied and built in France with sodium, as a coolant. CEA will maintain active international R&D cooperation in this field.

Beyond this technology, high temperature gas-cooled reactors are promising. They are simple and could be standardized, hence be economic. They can combine good passive safety characteristics, the advantage of an inert coolant, and the capability to accommodate fast spectrum cores.

Therefore, CEA is today dedicating its main innovative R&D efforts towards the development of the Gas Cooled Reactors (GCR) and fuel cycle technological range (fuel and fuel cycle, materials, helium circuits and technology) with the objective of developing and qualifying the related key technologies, with defining and producing a first flexible GCR demonstrator by 2012, and realizing a first integrated fuel cycle experiment.

These solutions regarding uranium best consumption and plutonium recycling are also studied in a way to bring efficient and acceptable solutions for HLLL waste minimization and management while reinforcing knowledge on health and environment impact of nuclear activities.

Regulating Nuclear Safety in Today's Socioeconomic Environment

Jeffrey S. Merrifield
Commissioner, United States Nuclear Regulatory Commission

Commissioner Merrifield will discuss the United States' energy market, the effects that changes in the market have had on nuclear operations, and the response of the Nuclear Regulatory Commission to these changes. The major factors shaping the socioeconomic environment for nuclear power are a progressively deregulated domestic energy market, President Bush's national energy plan, and Congressional legislation aimed at improving the regulatory environment for nuclear power.

Deregulation has sparked numerous industry initiatives that have required regulatory oversight including (1) corporate mergers and acquisitions requiring license transfers, (2) requests for new and increasing power uprates, and (3) the need for the NRC to ensure that licensing is carried out in an effective and efficient manner. More predictable regulation and the positive economics for nuclear power have, in turn, sparked license renewal applications. Commissioner Merrifield will discuss each of these areas in detail.

In addition to deregulation efforts, the political climate for nuclear power has also changed significantly in the past 2 years. In response to these changes, industry has expressed an interest in building new nuclear plants in the United States. Significantly, Dominion Energy announced a potential site for a new reactor and announced that it plans to seek an Early Site Permit, which is a first step in a new plant licensing process. Commissioner Merrifield will discuss these issues and the NRC's efforts to ensure that it is prepared to review any new plant licensing issues, if they arise.

OPENING SESSION

遠 山 敦 子 氏　略歴

1938年　生まれ

学　歴：
1962年３月　東京大学法学部卒業

職　歴：
1962年４月　文部省入省
（1970年　1973年　総理府に出向）
1977年９月　文部省学術国際局情報図書館課長
1980年６月　文部省ユネスコ国際部国際学術課長
1982年７月　部省初等中等教育局中学校教育課長
1985年７月　文部省高等教育局企画課長
1988年６月　文化庁文化部長
1989年４月　文化庁次長
1991年６月　文部省教育助成局長
1992年７月　部省高等教育局長
1994年７月　文化庁長官
1996年１月　文部省顧問
1996年６月　駐トルコ共和国大使
1999年10月　文化庁顧問
2000年４月　国立西洋美術館長
2001年４月　独立行政法人国立美術館理事長
2001年４月　文部科学大臣

Atsuko Toyama

Date of Birth： December 10, 1938

Education：
March 1962 graduated from Department of Law, University of Tokyo

Professional Career：

April 1962	Official of the Ministry of Education, Science, Sports and Culture (MESSC)
April 1970	Official, Prime Minister's office
June 1980	Director, International Scientific Affairs Division, Science and International Affairs Bureau, MESSC
July 1985	Director, Planning Division, Higher Education Bureau, MESSC
June 1988	Director-General, Cultural Affairs Department, Agency for Cultural Affairs
June 1991	Director-General, Local Education Support Bureau, MESSC
July 1994	Commissioner, Agency for Cultural Affairs
June 1996	Ambassador Extraordinary and Plenipotentiary, Embassy of Japan in Turkey
April 2001	President, Independent Administrative Institution National Museum of Art
April 2001	Minister of Education, Culture, Sports, Science and Technology

OPENING SESSION

松　あきら 氏　略歴

1947年　生まれ

学　歴：
1966年　宝塚音楽学校卒

職　歴：
1966年　宝塚歌劇団入団（1982年退団）
1995年　参議院議員初当選
1998年　日本ユネスコ国内委員会委員
2001年　参議院議員再当選
　　参議院厚生労働委員会理事
　　参議院国民生活・経済に関する調査会理事
　　公明党女性局長
2002年　経済産業大臣政務官就任

Akira Matsu

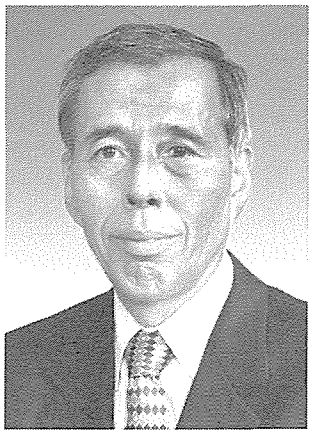
Date of Birth：December 3, 1947

Education：
1966　graduated from Takarazuka Musical Drama School

Occupational Career：
1966　joined Takarazuka Review Company (1982 left the company)
1995　elected first as Member of the House of Councillors (HC)
1998　Member, Japanese National Commission for UNESCO
2001　re-elected as Member of the HC
　　Director, Committee on Health, Welfare and Labour, HC
　　Director, Research Committee on National Life and Economy, HC
　　Director, Women's Bureau, Koumeito
2002　Parliamentary Secretary for Economy, Trade and Industry

SESSION 2

岩　木　浩　氏　略歴



1941年　生まれ

学　歴：
1964年３月　千葉大学園芸学部卒

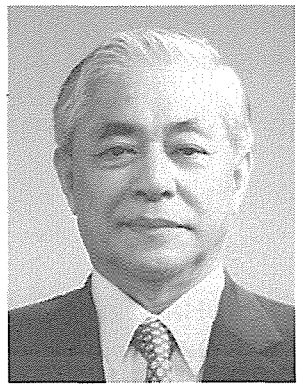
職　歴：
1966年７月　大宮市役所入職
1992年４月　建設局　都市計画部次長
1996年４月　同局　参事
1998年４月　同局　建築部長
1999年４月　事業局　西口開発部長
2000年４月　同局　理事
2001年５月　さいたま市理事兼大宮総合行政センター長
2001年６月　さいたま市助役

Hiroshi Iwaki

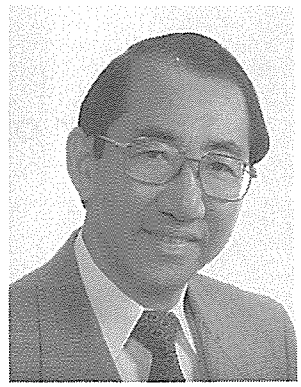
Date of Birth：July 8, 1941

Education：
March 1964 graduated from Faculty of Horticulture, Chiba University

Occupational Career：
July 1966　joined Omiya City Office
April 1992　Construction Bureau
April 1999　Enterprise Bureau
May 2001　Director of Saitama City
June 2001　Deputy Mayor, Saitama City



Jun-ichi Nishizawa
JAIF Chairman



Katsuhiko Suetsugu
Chairman of the
Preparatory Committee

The 35th JAIF Annual Conference

Main Theme : Nuclear Power in Challenging Socio-Political Environment--Challenges for the Future

The Japan Atomic Industrial Forum (JAIF) will hold its 35th annual conference in Saitama, just outside Tokyo on April 22-24, 2002. The JAIF conference has been well acknowledged not only among nuclear industry, but also in energy industry as a whole.
With its scale of 1,500 participants and extensive issues dealt with, ranging from fuel cycle to global environment and electricity market, the conference sets a great opportunity for those attending to be exposed to the most timely issues.

The world nuclear industry has been undergoing a great dynamism in recent years. It is a common understanding that nuclear energy produces no CO_2 in generating electricity, effective as a global warming solution, while companies' merger is vitalizing nuclear business in a competitive energy market. Meantime, growing concerns over safety, radioactive waste disposal and economy in a deregulated electricity market are the major challenges that the industry faces. In Japan, a recent event such as the refusal of MOX use by the siting local community poses a serious problem to the nation's long-term nuclear plan, highlighting the significance of the public acceptance built by coordinated efforts among parties concerned. In some countries like UK, and US as a welcome move the energy policy reviews tend to evaluate nuclear energy to meet their future electricity requirements. Nuclear energy's potential is dependent on our efficient business to materialize.

The JAIF Annual Conference provides a platform where specialists in various fields exchange views and ideas on those issues related to nuclear energy. Its aim is to serve global energy security with respect to the sustainable development.

Program of the 35th JAIF Annual Conference

Date: April 22 (Mon.) - 24 (Wed.), 2002

Venue: Omiya Sonic City Sonic City Hall, Saitama City, Saitama Prefecture, Japan

Theme: Nuclear Power in the Changing Socio-Political Environment - Challenges for the Future

April 22 (Mon.)	April 23 (Tue.)	April 24 (Wed.)
Registration (8:45 -)	**Session II** (9:00 - 12:00) Tasks for Metropolitan Areas and Regions with Nuclear Facilities (Panel Discussion)	**Session IV** (9:00-11:45) Contribution of Nuclear Power under the New Socio-Economic Environment (Panel Discussion)
Opening Session (9:30-11:00) 〈Remarks〉 ・ JAIF Chairman ・ Senior Government Official ・ Chairman of the Preparatory Committee		
Session I (11:15-12:30) Energy Policy of the 21st Century and Nuclear Power (Lecture Session)		
〈Lunch Break〉 (12:30-14:00)	**Luncheon** (12:15-14:15) (at "Rose Room", 4th Floor, Omiya Palace Hotel)	〈Lunch Break〉 (11:45-12:45)
Performance: "Ayako-Mai (Ayako-Dance)" from Kashiwazaki City	**Nuclear Video** (13:00-)	**Public Talks** (12:45-14:45) (at Civic Hall, 4th floor of Main Bldg.)
Session I (cont.) (14:00-17:00) Energy Policy of the 21st Century and Nuclear Power (Lecture Session)	**Session III** (14:30-17:30) Why Plutonium Recycling? (Panel Discussion)	**Session V** (15:00-17:30) To shape the future of nuclear power: Development of advanced and innovative reactors (Lecture Session)
Reception (17:30-19:00) at "Rose Room", 4th Floor, Omiya Palace Hotel		

Youth Forum
(12:30-14:00)
(at Civic Hall, 4th floor of Main Bldg.)
organized by ACT for E^3

Program of the 35th JAIF Annual Conference

Main Theme: Nuclear Power in the Changing Socio-Political Environment -- Challenges for the Future

April 22 (Monday)

Registration (8:45 -) at Omiya Sonic City - Sonic City Hall

Opening Session (9:30-11:00)

Chairperson: Tsutomu Kanai, Vice Chairman of JAIF and the Chairman of Hitachi, Ltd.

Remarks :

- Jun-ichi Nishizawa, JAIF Chairman
- Atsuko Tohyama, Minister of Education, Culture, Sports, Science and Technology
- Akira Matsu, Parliamentary Secretary for Economy, Trade and Industry
- Yoshihiko Tsuchiya, Governor, Saitama Prefecture
- Katsuhiko Suetsugu, Chairman of the Preparatory Committee Secretary General, Asia Pacific Energy Forum

Session 1: "Energy Policy of the 21st Century and Nuclear Power"
(morning session: 11:15 - 12:30 Lecture Session)

Chairperson: Yosaku Fuji, President, Kansai Electric Power Co. Inc.

Speakers :

- "U.S. Energy Policy and the Nuclear Renaissance"
  Joe F. Colvin, President and CEO, Nuclear Energy Institute, USA
- " Nuclear Energy and Sustainable Development"
  Jacques Bouchard, Director, Nuclear Energy Direction, Atomic Energy Commission (CEA) , France

<Folk Dance Performance: "Ayako-Mai" from Kashiwazaki City>(13:15 - 13:45)

Session 1: "Energy Policy of the 21st Century and Nuclear Power"
(afternoon session: 14:00 - 17:00)

Chairperson: Yumi Akimoto, Chairman, Mitsubishi Materials Corp.

Speakers:

- "How to Achieve New Nuclear Build in a De-Regulated Market"
  Norman Askew, CEO, British Nuclear Fuels, U.K.
- "Nuclear Power in Europe – Will Reality Overcome Ideology ?"
  Peter Haug, Secretary General, Forum Atomique Europeen (FORATOM)
- "Status and Perspectives of Nuclear Power in Russia"
  Leonid Alexandrovich Bolshov, Director, Nuclear Safety Institute, Russian Academy of Sciences
- "Nuclear Power from the View Point of an Environmentalist"
  Bruno Comby, President, Environmentalists for Nuclear Energy (EFN), France
- "Energy of the 21st Century and Nuclear Power"
  Nobuya Minami, President, Tokyo Electric Power Co.,

Reception (17:30-19:00) at "Rose Room", 4th Floor of Omiya Palace Hotel

April 23 (Tuesday)

Session 2: "Tasks for Metropolitan Areas and Regions with Nuclear Facilities"
(9:00 - 12:00 Panel discussion)

Chairperson: Akio Morishima, President, Institute for Global Environmental Strategies

Keynote Speech: Electric Power Source Siting from the Viewpoint of Local Promotion
--Enhancing the mutual understanding between power-consuming and power-producing areas--
Isao Shimohirao, Professor, Faculty of Economics, Fukushima University

Panelists :

- Masazumi Saikawa, Mayor of Kashiwazaki City
- Miyako Matsuda, Specialist on Living Environment
- Ryuichi Hamada, Senior Managing Director, Federation of Electric Power Companies
- Hiroshi Iwaki, Deputy Mayor, Saitama City

Luncheon (12:15-14:15) at "Rose Room", 4th Floor, Omiya Palace Hotel

Chair: Jun-ichi Nishizawa, JAIF Chairman

Remarks: Yukio Kurita, Governor, Fukui Prefecture

Speech: "Kabuki on the World Stage"
Toshio Kawatake, Chairman, Japan Theater Arts Association

Session 3: "Why Plutonium Recycling?" (14:30 - 17:30 Panel discussion)

Chairperson: Shunsuke Kondo, Professor, University of Tokyo

Panelists :

- Yoji Uchiyama, Professor, Tsukuba University
- Toshiaki Enomoto, Managing Director, Tokyo Electric Power Co.,
- Tatsujiro Suzuki, Senior Research Scientist, Central Research Institute of Electric Power Industry
- Jun Tateno, Professor, Chuo University
- Hiroshi Noda, Director, FBR Cycle System Development Office, Japan Nuclear Cycle Development Institute (JNC)
- Jacques Bouchard, Director, Nuclear Energy Direction, Atomic Energy Commission (CEA), France

April 24 (Wednesday)

Session 4: "Contribution of Nuclear Power under the New Socio-Economic Environment" (9:00 - 11:45 Panel discussion)

Chairperson: Masao Nakamura, Scientific Journalist

Keynote Speech: Jeffrey S. Merrifield, Commissioner, United States Nuclear Regulatory Commission

Panelists :

- Yang-Uoo Choe, President, Korea Hydro & Nuclear Power Company
- Rod Krich, Vice President for Licensing Projects, Exelon Corporation, USA
- Steven G. P. Brosnan, Executive Director, Energy Sales and Trading, Magnox Electric plc
- James A. Fici, Senior Vice President, Nuclear Plant Projects, Westinghouse Electric Company, USA
- Tsutomu Toichi, Managing Director, Institute of Energy Economics, Japan
- Jeffrey S. Merrifield, Commissioner, USNRC

Public Talks (12:45-14:45) at Civic Hall, 4th floor of Main Bldg.

Facilitator: Yoshiko Tsuchiya, Freelance Announcer
Commentators:

- Marino Osami, Director, Japan Consumers' Association
- Michio Suzuki, Managing Director, Nuclear Waste Management Organization of Japan (NUMO)
- Hiroshi Noda, Director, FBR Cycle System Development Office, Japan Nuclear Cycle Development Institute (JNC)
- Gail H. Marcus, Principal Deputy Director, Office of Nuclear Energy Science and Technology, Department of Energy, USA

Session 5: "To shape the future of nuclear power : Development of advanced and innovative reactors" (15:00-17:30 Lecture Session)

Chairperson: Hiromichi Yokoyama, Editorial Writer, the Mainichi Newspaper

Speakers :

- "Strategy for the Deployment of Pebble Bed Modular Reactor - toward the African Renaissance"
  David Nicholls, CEO, Pebble Bed Modular Reactor Ltd., South Africa
- "Development of Innovative Light Water Reactors in Japan"
  Yoichi Aeba, Special Advisor, Mitsubishi Heavy Industries, Ltd.
- "Development of Generation Four Reactors and the U.S. Strategy"
  Gail H. Marcus, Principal Deputy Director, Office of Nuclear Energy Science and Technology, Department of Energy, USA
- "International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) "
  Poong Eil Juhn, Director, Division of Nuclear Power, IAEA
- "Prospects for Commercialization of Fast Breeder Reactors; from Strategic Study for Commercialization of FBR Fuel Cycle System"
  Kiyoto Aizawa, Executive Director, JNC

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Youth Forum: 12:30-14:00, Tuesday April 23 (at Civic Hall, 4th Floor of Main Bldg.)
organized by ACT for E^3

April 22 (Monday)

Opening Session　(9:30～11:00)

- Remarks
- Lecture

Remarks by JAIF Chairman

Jun-ichi Nishizawa
Chairman of Japan Atomic Industrial Forum

Prefectural Governor's Remarks

May I first of all thank you for coming to Saitama, 'The Land of Many Colors', and welcome you on behalf of our seven million inhabitants.

Saitama Prefecture is deeply honored to have so many illustrious figures from the world's nuclear industry gathered under one roof at this the 35th JAIF Annual Conference.

I would like to express our appreciation and gratitude to you for all the hard work you put into providing us with a stable energy supply to support our daily lives, both day and night.

As you can tell from our nickname, 'The Land of Many Colors', Saitama Prefecture is blessed with beautiful natural resources throughout the four seasons, ample industry and manpower, and is brimming over with youth and vitality.

I am doing my best to govern the prefecture based on the twin ideals of "prioritizing environmental issues" and "focusing on citizens' lives" in order to build a place where people will be happy to live – "the best home in Japan" – and to maximize Saitama's diverse richness and potential for growth.

The 2002 FIFA World Cup™ jointly hosted by Korea and Japan will take place this year, and four matches including Japan's opening game and the semifinal will be played at Saitama Stadium 2002. We are also promoting projects such as Saitama Shintoshin (New Urban Center), which is growing into the capital city of the Kanto region, and SKIP City – Saitama Kawaguchi Intelligent Park, where next-generation industries centering on the audio-visual sector are starting to congregate. I hope that during your stay you will notice the leaps and bounds by which Saitama is progressing.

Turning now to the subject of energy, one of the greatest tasks we face is the shift in energy provision in Japan from an emphasis on economic priorities to an emphasis on minimizing environmental burdens and enabling sustainable development.

Although the nuclear power currently accounting for around one third of our electricity is a vital source of clean energy, assisting in the reduction of carbon dioxide emissions, it still entails large problems such as the disposal of nuclear waste, and there are calls for improvements in disclosure of information, and in ensuring safety.

Over the next three days you will be hotly debating the future of energy, and the development and use of nuclear power under the keynote theme, "Nuclear Power in the Changing Socio-Political Environment -Challenges for the Future".

It is my sincere hope that this meeting will be useful in obtaining the further understanding and cooperation of the public, enable an overview of future energy policy, and prove to be a fruitful occasion. I would like to finish my remarks by wishing all the participants in the conference the best of health, and thanking you for your time and attention.

Yoshihiko Tsuchiya
Governor of Saitama Prefecture

Lecture by Preparatory Committee Chairman

Katsuhiko Suetsugu
Chairman of the Preparatory Committee
Secretary General, Asia Pacific Energy Forum

[MEMO]

[MEMO]

April 22 (Monday)

Session 1 "Energy Policy of the 21st Century and Nuclear Power"

(morning session: 11:15 ～ 12:30 Lecture Session)

(afternoon session: 14:00 ～ 17:00)

Development of sustainable societies, ones that can enjoy continued economic growth while protecting the environment and preventing further global warming, is the greatest challenge facing all nations today.

In this session, each nation's energy policy for the 21st century will be presented, along with how industry's response to it. In furtherance of building sustainable societies, policy makers from each country will explain how they define and position nuclear energy within their overall energy policy. This will be a useful reference for other participants in their own assessments and policy making.

U.S. Energy Policy and the Nuclear Renaissance

Joe F. Colvin
President and Chief Executive Officer,
Nuclear Energy Institute

SUMMARY

Two years ago, I told this distinguished audience that the U.S. nuclear industry was achieving excellent performance and safety results. I predicted even brighter days ahead. I am pleased to say that the industry has more than justified my optimism. The year just past has produced industry-wide performance and safety records, and we have the potential to do even better in the future. The Bush Administration energy policy includes an expanded role for nuclear energy in the U.S. energy mix of the 21st Century, and the Administration already is taking action to help the industry to fulfill that role.

President Bush has decided that the Yucca Mountain site in Nevada is well suited to be the national repository for used nuclear fuel. Secretary of Energy Spencer Abraham has announced the Nuclear Power 2010 initiative, a program whose goal is the deployment of new nuclear plants in the U.S. by 2010. Two U.S. nuclear companies are beginning to implement early site development plans for the next generation of nuclear facilities.

The U.S. Nuclear Regulatory Commission also has adopted new regulations to simplify the license renewal process for existing plants. Virtually all U.S. nuclear plants are expected to renew their licenses. The NRC also is streamlining the regulatory process for the siting and licensing of new plants.

The Administration can move confidently toward inclusion of nuclear energy in the future U.S. energy mix because the U.S. nuclear industry continues to compile an excellent record of productivity and safety. U.S. nuclear plants produced a record 767 billion kilowatt-hours of electricity in 2001, 12 billion kilowatt-hours more than the record total of 2000. U.S. nuclear plants also reached an industry-wide capacity factor record of 91 percent in 2001. All measures of plant safety also were improved from their record levels of the previous year. Production costs continued to fall in 2001, establishing nuclear energy as the most economical source of electricity widely available in the U.S.

Nuclear energy has a combination of low production costs, forward price stability and environmental advantages that no other fuel widely available in the U.S. can match. The value of nuclear energy to the present and future energy supply and economic stability of the U.S. is broadly acknowledged by the American public, government officials, the media and other opinion leaders.

The strategic direction for the future of the U.S. nuclear industry is embodied in *Vision 2020*, a plan whose ambitious goal is the construction of 50,000 megawatts of new nuclear capacity in the U.S by 2020, along with another 10,000 megawatts of capacity through expansion of existing plants. The U.S. nuclear industry is now working with the Administration on detailed plans to realize *Vision 2020*, and we are confident that the goals of *Vision 2020* will be achieved.

Nuclear Energy and Sustainable Development

Jacques BOUCHARD,
Director of Nuclear Energy Division, CEA

・Sustainable Development

Globalization and sustainable development are among the topics of the current societal debate. This is the perspective in which I would like to discuss nuclear energy.

Sustainable development is defined as a development form, which meets the needs of the present-day generation without jeopardizing the chances for future generations to meet their own. This concept relies on three major conditions, namely economic growth, environmental conservation and social well being. Far from being just a fad or a new business communication device, sustainable development seems to be reshaping behavioral patterns.

It is essential for energy debates to take place in this context, first because energy is central to the world potential for development, and second because the choices being made today are commitments for the future.

・The importance of oil and gas

・The sound economics of nuclear energy

・Nuclear energy and the environment

・Nuclear energy and social equity

・Necessary and possible progress, for a sustainable development

・Where do we go from here ?

How to Achieve New Nuclear Build in a De-Regulated Market

Norman Askew
CEO, British Nuclear Fuels, U.K.

1. The key to achieving new build of any fuel source in a de-regulated market is to establish an environment in which private investors (eg banks/utilities) have sufficient confidence to invest in nuclear power. Investors need to be assured that:

- The political climate is right for investment.
- The legislative framework is acceptable.
- There is confidence in an acceptable financial return.
- The financial return is assured on a reasonable timescale

These factors will be discussed in the presentation:

2. <u>The political climate and legal framework</u>

In a de-regulated market private investors will be influenced by the political climate: it has to be supportive of nuclear power if new build is to take place. The prerequisites for new build include:

(i) Establishing a framework where planning approval/site permits can be obtained within a reasonable and predictable time frame;
(ii) Providing a framework which gives nuclear power equitable treatment compared with other generating options. This should embrace proper treatment of the environmental effects of all forms of generation, eg appropriate incentives for carbon free electricity;
(iii) Providing a clear policy and strategy for dealing with nuclear waste. Technical solutions are available but political will is needed to bring these about;
(iv) The legal framework needs to minimise the risk of abortive capital investment, eg through intervenes making late legal challenges prior to commissioning/operation; and
(v) Finally, political support would be expected to have a significant effect on public opinion; which has a significant influence on investor confidence.

3. <u>Investors need to be assured of an adequate financial return over a reasonable timescale</u>

To achieve new build the industry needs to strive to :

(i) Demonstrate that shorter construction periods can be achieved for new nuclear power plants.

(ii) Continue the drive to reduce capital costs, eg lower capital costs on advanced passive or small modular reactors reduce the risks to investors.

(iii) Investors need long term contracts at an electricity price which offers a reasonably assured rate of return. This applies to other base load fuel types.

4. The presentation will address how close to achieving new nuclear build we are within the US and the UK. In the UK it will summarise the status of the UK energy review, eg siting the positive steps the government is preparing to make to keep the nuclear option open. In the US it will outline the steps being taken by the Bush administration to bring new nuclear construction nearer.

5. The presentation will show that BNFL has a reactor portfolio which positions it to respond to the anticipated resurgence of nuclear power.

Nuclear Power in Europe: Will Reality Overcome Ideology?

Peter Haug
Secretary General
European Atomic Forum (FORATOM)

SUMMERY

Energy specialists are now talking seriously about the prospects for a revival of nuclear power in Europe. The rational view is that moves to 'replace nuclear with nuclear' make perfect sense. It seems logical for power companies to start planning now to replace those nuclear plants that are due for retirement over the next two decades. There are two compelling reasons for this: one economic, the other environmental.

Firstly, the European Union is facing the threat of growing dependence on external sources for its energy supply. There is a need to strengthen energy independence and to rely to a greater extent on energy sources that offer reliable supplies at prices that are both reasonable and stable. Nuclear satisfies these demands.

Secondly, the EU has given a firm commitment to meet its obligations under the Kyoto Protocol. But it is generally accepted that it cannot do so without the nuclear component in the Community's energy mix.

These economic and environmental pressures should, in theory, be enough to ensure that nuclear energy has a bright and secure future in Europe. However, the fact remains that plans for nuclear new-build on a significant scale are bound to stir up opposition from both politicians from certain political parties and anti-nuclear activist groups.

However, a sense of realism is already emerging. The Green Party in Germany, when it became the junior partner in the country's coalition government sought a quick exit from the use of nuclear. But it was quickly realised that such a move was simply not practicable, so a longer-term process was agreed by the government and the major power companies.

In Sweden, they have had little success so far in starting a phase-out of nuclear power. One reactor unit has been closed, but plans for a second closure have been shelved for the time being, because the hoped-for conditions have not emerged.

Belgium is the latest European country to try to enforce a phase-out of nuclear power – by limiting to 40 years the lifetime of the existing seven reactor units. But even so, a draft law on this will contain an escape clause, which will enable the government to lift the time restriction if it becomes clear that there is no alternative

to keeping the nuclear plants running.

There is a common thread running through these phase-out moves. In each case, the principal coalition parties have had to secure the support of Green party leaders in order to build and maintain an effective government machine. This support has been won by allowing the Greens to pursue their anti-nuclear agenda by incorporating it into government policy, even though the Greens have only limited support among the voters.

Therefore, we already see in Europe that extreme ideological positions do not fit in with the practicalities of electricity production and energy policy in general. If Europe is to meet its future electricity needs in a manner that is economically and environmentally acceptable, it cannot afford to exclude certain options, like nuclear, on purely ideological grounds.

Status and Perspectives of Nuclear Power in Russia

Prof. Leonid Bolshov
Director, Nuclear Safety Institute, Russian Academy of Sciences (IBRAE RAS)
and
Dr. Alexandre Vatulin
Director, All-Russian R&D Institute of Inorganic Materials (VNIINM)

ABSTRACT

An overview of the present status, near- and long-term perspectives of nuclear power in Russia is given within the frameworks of a national strategy of development of nuclear power in the first half of the XXI century adopted in the year 2000. Major performance indicators of the nuclear power plants in operation in Russia are presented and analyzed against the background of relevant data world-wide with a focus on operational safety and efficiency.

Plans of Rosenergoatom (a lead Russian NPP operator) to complete construction and bring into operation in Russia new nuclear power units in the next few years are discussed. Near term commitments and plans to export Russia-designed nuclear power plants into third countries are also presented.

Long-term nuclear power development forecasts for the next about 20 years, including nuclear generating capacities and fuel cycle facilities, are reviewed and analyzed from the viewpoint of growing national economy, energy demand and energy balances. A conclusion is made that the nuclear power industry in Russia is on revival, and should be capable of keeping its niche in the national energy balance.

Nuclear Power from the View Point of an Environmentalist

Bruno Comby
President of Enviromentalists for Nuclear Energy

Today, many environmental organizations oppose nuclear energy. They propose many reasons to explain why, according to them, nuclear energy would be dangerously unsafe, unclean, anti-democratic, and should be considered as an energy with no future.

However, as an environmentalist dedicated since 20 years to promoting a better life-style and protection of the environment, and with some knowledge in the field of energy, I propose a new view point, based on solid scientific and environmental facts, rather than on irrational dogmas or political agendas, which shows that, for environmental reasons, well built and well-operated nuclear energy is in fact very ecological and can be considered as a central pillar for the satisfaction in a clean manner of the planet's energy needs, that is for creating or maintaining peace and an acceptable life-style for all inhabitants of the planet Earth, and especially to face the thirst for energy of industrial modern countries while saving as much as possible theuse of fossile energies for other uses than just burning it and for the development of the poorer countries in Asia, South and Central America, and Africa, until they, themselves will access a level of industrial and financial wealth sufficient to access the use of clean nuclear energy.

While many environmental groups continue to criticize nuclear energy, and sometimes influence the political decisions of some countries, this new environmental view point leads to the conclusion that nuclear contrary is in fact the safest and cleanest energy available, and will be absolutely necessary to satisfy the planet's energy needs in the 21st century.

Energy of the 21st Century and Nuclear Power

Nobuya Minami
President, Tokyo Electric Power Co.,

[MEMO]

[MEMO]

April 23 (Tuesday)

Session 2 "Tasks for Metropolitan Areas and Regions with Nuclear Facilities" (9:00 ～ 12:00 Panel discussion)

Metropolitan areas are the nuclei in Japanese political and economic affairs despite problems associated with dense populations and the environment. They are also large electricity-consuming areas. In contrast, local municipalities, while having to grapple with issues of depopulation and economic stagnation, are the hosts of nuclear facilities including nuclear power plants that supply electricity to the metropolitan areas and nuclear fuel cycle facilities.

Session 2 will discuss issues in that differing awareness between electricity-consuming and nuclear-siting areas. It will also highlight problems of local municipalities with nuclear facilities and focus on measures to promote mutual understanding that may help siting areas develop themselves with nuclear facilities.

- Keynote Speech
- Panel Discussion

Electric Power Source Siting from the Viewpoint of Local Promotion — Enhancing the mutual understanding between power-consuming and power-producing areas —

Isao Shimohirao
Professor, Faculty of Economics, Fukushima University

Ⅰ. Basic Propositions

To find a simultaneous solution to the following two issues

1) National requirements: The necessity to smoothly promote the development of electric power sources (the increase of energy demand worldwide, aging of the population and increase of electric energy consumption, environmental problems on the global scale such as the CO_2 emission).
2) Local requirements: The expectation of local residents for the nuclear plants' triggering effect to increase employment opportunities, to help younger generation stay in the local communities, to upgrade their educational and cultural facilities and transportation system.

Ⅱ. Problems

1. The change of perception of nuclear plants by the public—people used to think that accepting a nuclear plants was for their community to become one of the most advanced areas in the country because a large number of scientists of highest technology would gather and stay. Now they think that nuclear plants are just troubles.
2. The priority was placed on promotion of electric power source siting than considering the local residents.
3. The change of the local needs. (Higher income and better employment ratio were more important in the past. Today, the priority has shifted to keeping younger generation in the communities, making higher educational facilities available, improving medical and welfare systems, and upgrading transportation system.)
4. The mutual understanding between power-consuming and power-producing areas.
5. The delay of energy conservation policies and risk communications.
6. The limit of local promotion policies (the facilities had been built, but the younger people did not stay.)

Categorization of separate problems

1. Problems that relate to the promotion of areas where nuclear power plants are built
2. Problems that relate to the promotion of local industries
3. Problems that relate to the local municipalities finance
4. Problems that relate to the grants system under the three electric power-source siting laws
5. Problems that relate to the utilization of public facilities on a large scale and/or in a wide region

Issues between Power-consuming and Power-producing Areas

Miyako Matsuda
Associate professor, Fuji Tokoha University,
Specialist on living Environment

SUMMARY :

All of us are aware of the importance of electricity, but most of us do not know what happens to the spent fuels that were used in nuclear power plants.

The people in Japan need to understand the situation of the issue correctly in order to better deal with nuclear waste problem that is deeply connected with Japan's energy policy.

We can learn from the experiences of some of the advanced countries in Europe that have been working on this issue for more than ten years and have obtained positive results.

PRESENTATION :

I am giving lectures now at my university under the titles of "waste management," "industrial activities and environmental impacts" and others. I have also been involved in garbage management and recycling activities for more than twenty years.

However, frankly speaking, I was not much interested in nuclear power until I became a commissioner of government committee on nuclear fuel cycle back-end policy. Whenever something goes wrong at nuclear power plants, the media stir up uneasiness among the public. I myself felt rather awkward when I saw extremely aggressive movements of anti-nuclear, and thus decided not to learn about the issue of nuclear wastes actively.

Even now, there are many people, including my colleague professors and friends, who just back off when I raise the issue of nuclear power. I assume that most of these people feel the way I used to.

But when I was designated to be a commissioner of a governmental committee to consider management of nuclear wastes, I felt responsible and decided to study how other countries are coping with this problem. I visited Europe for that purpose on my own expense and was overwhelmed by their advanced activities. That experience gave me the sense of crisis that if the majority of us remained indifferent to nuclear wastes, the Japan's energy policy could come to a standstill.

This issue is so important that we cannot keep avoiding it by saying "I do not know" or "I do not want to know." Everybody has to think about it and bring their ideas. I have come to think that if my experience in the field of the management of household waste would help in any way, I would gladly cooperate with the people in the nuclear field.

Looking back, twenty years ago when Japan was filled with the garbage from households and the situation became very severe, the people responsible for handling garbage at each municipality became so desperate to deal with the problem by themselves and did not ask for help from outside and faced the dead end alone, just like those people who are responsible for nuclear waste management today.

However, in the case of household garbage, when information was passed widely and accurately, increasing number of people responded and said that garbage was the result of everyone's life so "let's get together and try to come up with ideas." Because of such movements, our recycling system of household waste has become one of the best in the world in the last ten years.

Based on this experience, I strongly believe that if we can communicate efficiently and spread information adequately, we will find many people who can think of this issue seriously. I talk to my friends that the issue of nuclear wastes is an applied case of household garbage. I tell them that it is not such a difficult problem, and that we need to think about it together.

There are many people in local communities all over the country who are active in environmental and/or garbage-related activities on a grass root level, such as leaders of environmental study groups and advisors on garbage processing and recycling. It would be wonderful if these people started to learn about nuclear wastes as well as an applied case of general garbage and its recycling. I want to expand a loop of these active people.

The media has often said that the people who live in "the power-consuming areas" do not understand the pain of the people who live in "the power-producing areas." But when we are categorized by such a simple definition, we become discouraged and unable to do anything. The people in the power-consuming areas, i.e. big cities must have various thoughts and opinions, and so do the people in the power-producing areas, i.e. the areas in which power plants are located. If the media continue to stereotype the people, the only consequence they face would be a more disagreeing audience. It is even possible that some people in the production area feel offended by the wrong image given to them by the media

From now on, we must forget about the categorization of consumption versus production, and use the knowledge and experience that we gained through garbage management and its recycling activities to start discussions on the issues of nuclear

power and its waste management in an open environment where we all can see each other well, face to face.

For that purpose, the people in nuclear field have to release more information and exchange views with the public, as other advanced nations have done, whether it is about a process of nuclear power generation or selection of nuclear waste disposal sites, and keep working with a long term perspective until they find the right answer. That effort will help us create the basic platform on which people in nuclear field and the general public of Japan can develop the national energy policy together.

Issues for Metropolitan Areas and Localities that Host Nuclear Power Facilities

Ryuichi Hamada
Senior Managing Director, Federation of Electric Power Companies

1. Nuclear Power will Continue to Retain its Importance

(1) Nuclear Power has a Vital Role to Play as a Key Source of Energy

- Nuclear Power Generates One-third of Japan's Electricity

(2) Assuring Energy Security

- Japan is Far from Self-sufficient in Energy

(3) Dealing with the Problem of Global Warming

- The Promotion of Nuclear Power According to the *Outline for Promotion of Efforts to Prevent Global Warming*
- Adopting New Energy Sources

2. Improving Safety and Building Confidence in Nuclear Power

(1) Advances in Nuclear Power Safety

- Achieving Transparency

(2) Gaining the Confidence of the Public

- Safe and Stable Operation and Sound Promotion of the Nuclear Fuel Cycle

3. The Need to Form a National Public Consensus on Nuclear Power

(1) Power Company Activities in Host Localities and Metropolitan Areas

- The "One Million Campaign" to Attract More Visitors to See Nuclear Power Facilities for Themselves

(2) Seeking Progress towards Mutual Understanding

[MEMO]

[MEMO]

April 23 (Tuesday)

Luncheon (12:15～14:15)

(at "Rose room", 4th Floor, Omiya Palace Hotel)

・Remarks

by Yukio Kurita, Governor, Fukui Prefecture

・Speech

by Toshio Kawatake, Chairman, Japan Theater Arts Association

"Kabuki on the World Stage"

Kabuki on the World Stage

Toshio Kawatake

Chairman, Japan Theater Arts Association

1. Overseas public performances with much difficulties

2. Drama is well-received unexpectedly than stylized beauty.

3. Particularly "Shunkan" moved spectators in USSR and in other countries as well.

[MEMO]

April 23 (Tuesday)

Session 3 "Why Plutonium Recycling ?" (14:30～17:30 Panel discussion)

It is Japan's basic nuclear policy to reprocess spent fuel from nuclear power plants and to make full use of the recovered plutonium and uranium. Efforts to use MOX fuel in light water reactors have not, however, gone as the government and utilities had planned. This requires improved understanding of the people nationwide. This session will discuss the significance of plutonium recycling for power generation, seeking to clarify the future direction.

- Panel Discussion

Why We Need to Proceed with the Plutonium Recycling

Yohji Uchiyama
Professor, Institute of Engineering Mechanics and Systems ,
University of Tsukuba

Abstract

Nuclear power is an effective source of energy not only to fight against the greenhouse effect but also to achieve a stable energy supply. In order to hold up its pledges under the Kyoto Protocol, Japan has proposed to simultaneously implement economic efficiency, energy security and environmental protection. These goals are referred to as the "3Es". More specifically, as part of the policy to become less dependent on oil, Japan is attempting to develop new energy sources including nuclear power, and increase its use of natural gas, while strengthening Japan's energy conservation policies. Nuclear energy has more potential as an alternative to fossil fuels than other options against greenhouse effect both in terms of quantity and economy.

Looking at the climate surrounding the world's supply of energy, it is apparent that consideration must be given to the rapid increase in energy consumption in developing countries. With the 21st century, the world is confronted by a number of problems such as population increases and environmental disruptions. These problems are closely connected with the energy issue. The problems in Asia where most of countries are still under economical development with high population may be more severe than those in the other region. The world depends most of its energy needs on fossil fuels, but the quantity of such resources as oil and natural gas found in Asia is far less than that of Europe or other parts of the world. Nuclear power is a most reliable source of energy as an alternative to fossil fuels, especially for the Asian countries including Japan, whose energy supply structures are vulnerable.

Nuclear power does not produce greenhouse gases as well as sulfur oxides and nitrogen oxides. On the other hand, efforts must be made to continue the management and to dispose of radioactive nuclear waste in such a manner that radioactively will not affect the human living environment. Recycling of nuclear spent fuel will not only increase the inventory of uranium and plutonium resource, but it also contributes to reduce the environmental loads of radioactive wastes. If we don't reprocess them, we have to dispose of all the spent fuel as a high level waste.

If we reprocess, the uranium and plutonium collected from spent fuel will become a new fuel again of which value is equivalent to twenty to forty percent of the original fuel at maximum. Because the less amount of uranium 235 will be needed, the risk at uranium mines will also be less in terms of environment protection and safety.

In the 21st century, industries that aim at establishing a recycling-based society are desired to grow. We need to minimize the consumption of resources in our society, but we also need to recycle wastes and reuse them as valuable resources. Today, the recycling of general urban wastes and industrial wastes are proceeding steadily and newly created business related to this movement is serving as a vein of the society. Nuclear spent fuel can be reprocessed and recycled, and can also create new business. It is important to convert the negative factors of nuclear power to the positive by developing reprocessing technologies so that the nuclear energy will not be called "a house without a toilet."

MOX Program: Its Needs and Issues
-Toward Better Management of Spent Fuel and Plutonium-

Tatsujiro Suzuki
Senior Research Scientist
Central Research Institute of Electric Power Industry (CRIEPI)

SUMMARY

1. Need for MOX Program
   (1) Need for Safer Plutonium Management: Responding to Nuclear Terrorism Risks
   - Civilian plutonium stockpile is still growing, and its safe and secure management as well as its prompt reduction (disposition) are major international security concern.
   - Japan has the largest Pu stockpile among the non-nuclear weapon states, and has committed to "zero Pu-surplus" policy. MOX program is essential to implement its policy goal.

   (2) Need for Spent Fuel Management: Chain of Nuclear Fuel Cycle
   - Spent nuclear fuel is also accumulating and lack of storage capacity may force utilities to shut down the operating nuclear power plants.
   - MOX program, as a part of nuclear fuel cycle operation, is also an essential part of spent fuel management options.

2. Major Issues
   (1) Lack of Incentives to use Pu as a commercial fuel: Little benefit in using Pu over U
   - Liberalization of electricity market has increased the cost pressure on utilities
   - MOX fuel is more expensive than U fuel (for the foreseeable future), and thus there is little incentive for utilities to use Pu as a commercial fuel. Reprocessing-MOX recycling could be a large financial burden on utilities.

   (2) Unclear Division of Responsibility Between The Government and Private Utilities
   - MOX program is considered as "national project," but its implementation is responsibility of private utilities
   - Under liberalized market, this division of responsibility makes it more difficult for utilities to bear responsibility of MOX programs.

   (3) Lack of Mutual Trust between the Government/Utilities and Local

Gov't/Public

- Referendum of MOX program is not caused by "anti-MOX" sentiment, but by lack of mutual trust.
- Public trust is also eroding for other nuclear programs, also.

3. Future Options

(1) Clear Responsibility of Government and Private Utilities: Possible Government Ownership of Pu and/or Financial Assistance

- For security reasons, responsibility of the Government should be clarified. For example, the ownership of Pu could be transferred to the Government.
- Financial assistance or even the contract to private industry should be considered.

(2) Creating Programs to Restore Public Trust: Need for "Mediator"

- Sincere dialogue needs to be pursued, possibly with appointment of the third party as a reliable "Mediator."

(3) Promotion of Interim Storage of Spent Fuel: Reducing unnecessary reprocessing

- In order to better match supply/demand of plutonium, reprocessing schedule should be flexibly adjusted.

(4) Increasing the options of Pu Management and Disposition: Using R&D facilities and Cooperation with Other Countries

- Variety of options should be pursued in order to reduce Pu stockpile sooner.
- Sooner reduction, minimum transportation, minimum number of sites to handle Pu, are important three principles to consider.
  - Domestic Pu stockpile should be reduced first. Those can be burned in the government-owned research reactors (such as Monju and Fugen).
  - In order to minimize terrorism risks, number of sites should be minimized.
  - For Pu stockpile in Europe, cooperative programs with France and UK could be pursued (possible long term storage or disposition in Europe).
  - If MOX programs were stalled, immobilization option should also be considered in order to meet spent fuel standard.

Abstract of Presentation

Jun Tateno
Professor, Faculty of Commerce, Chuo University

While the capacity of nuclear power plants in Japan is increasing in a straight line, the amount of plutonium accumulated along with this increase shows a quadratic curve. Thus the question for us is how to deal with surging amount of plutonium. Plutonium has two contradicting sides; it is a valuable energy resource, but it also is a radioactive waste. These two sides must be fully recognized when we discuss and further develop our plutonium policies.

Japan's plutonium policies are;

1) to encourage the use of plutonium as "a domestically produced energy source";
2) to reprocess all of the spent fuel (which means to collect all the plutonium); and
3) not to maintain any surplus plutonium (which means to utilize all the plutonium) so as not to raise any suspicion among other countries that Japan is trying to use nuclear power militarily.

Based on these policies, Japan has decided to recycle all of its plutonium. When the plutonium recycling project had beed started, the plan was initially to use in Fast Breeder Reactors (FBR's), Advanced Thermal Reactors (ATR's) and Light Water Reactors (MOX fuel). But the project failed due to technological as well as economic reasons. Currently the project's only focus remains whether or not to continue to seek the utilization of MOX fuel in light water reactors. A long term perspective to proceed with our policies seems to be lost.

The MOX utilization in light water reactors is not the only technological problem that needs to be solved. There are other technological problems such as 'nonfissionable plutonium' which contains a large amount of Plutonium 240, and radioactive waste with extremely long life called Trans-Uranium (TRU). I think that we will not be able to process these materials technologically until Fast Breeder Reactors will start operating on a full scale.

When we contemplate the situation mentioned above, it becomes clear that we should not blindly persist only in the use of MOX fuel in light water reactors. Instead, we must consider various possibilities of plutonium processing, including reconsideration of an ATR that has a great advantage as a plutonium exclusive reactor, and make our choice cautiously and wisely.

Toward the establishment of Pu utilization in Japan

Hiroshi Noda
Director, FBR Cycle System Development Office
Executive Office for the Policy Planning & Administration
Japan Nuclear Cycle Development Institute (JNC)

ABSTRACT

At the entrance of the new century, the Pu utilization in Japan is investigated from the viewpoint of energy security and environmental preservation.

The abundance of material wealth that we currently enjoy has caused the destruction of nature and environmental pollution. In the 21st century, the global warming is one of the most talked-about issues that we must grapple with on a global scale. An entirely new framework must be promoted by breaking free of the old economic and social scheme of mass production, mass consumption and mass waste. As a result, we are seeking for a recycling-based, sustainable society in the 21st century.

In this new society, energy conservation has been kept basically and new energy system such as solar, wind and so on must be developed to satisfy the energy security and environmental preservation in Japan. Since it has the limit in capacities, however, nuclear energy without emission of CO_2 and so on is required as primary energy resources. Furthermore, it is necessary to implement the Plutonium-Thermal program and the introduction of FBR with the closed nuclear fuel cycle in addition to existing LWRs for the sustainability of economic growth. This necessity is confirmed in the new Nuclear Long-Term Program issued by JAEC. It is also argued in the Generation IV road map project in the U.S.

JNC has devoted itself to the development of reprocessing and fuel manufacturing technology, FBR and treatment of HLW in order to increase the efficiency of U utilization and to decrease the environmental impact with the establishment of the closed fuel cycle. Especially, Pu recovered has been used as the MOX fuel for Fugen more than 20 years. Its experience is effective to Plutonium-Thermal program.

Furthermore, the feasibility study on commercialized FBR cycle system has been carried out by a joint team with the participation of all parties concerned in Japan since July 1999. It aims to establish attractive and competitive FBR cycle system with targets satisfying the flexible future requirements such as economic competitiveness, efficient utilization of resources, reduction in environmental burden and enhancement of nuclear non-proliferation on the premise of ensuring safety. Its results will be confirmed by Joyo and Monju. Monju is considered the core

of the research and development activities for FBR and an international cooperation base open to researchers from Japan and abroad. Thus, the FBR with the new closed fuel cycle introducing innovative technologies will be expected to come to practical use to sustain the future energy. Performing these activities, we always make great efforts to bear in mind that the Pu utilization must be carried out with the policy of keeping transparency, remaining open to public and gaining public acceptance.

[MEMO]

April 24 (Wednesday)

Session 4 "Contribution of Nuclear Power under the New Socio-Economic Environment" (9:00 ～ 11:45 Panel discussion)

Current social and economic environments surrounding the electricity industry have prompted major reform of the majority of utilities worldwide. In the United States, where nuclear power generation has been traditionally deemed disadvantageous - too costly - compared with other power sources, nuclear power plants are now competitive and are again considered useful assets compared with other energy sources.

In this session, current situation of the United States and UK where movements toward the construction of new nuclear power plants have emerged, and Korea where efforts to introduce next-generation reactors are being made, will be reviewed. The session will also look into electricity market and the role of nuclear power generation in the new socio-economic environment, and discuss the shape of competitive nuclear power generation from both the utilities' and the regulators' points of view.

- Keynote Speech:
- Panel Discussion

Keynote Speech

Jeffrey S. Merrifield
Commissioner United States Nuclear Regulatory Commission

Prospects and Competitiveness of the Korean Nuclear Industry

Yang-uoo Choe
President & CEO
Korea Hydro & Nuclear Power Co., Ltd.

It is no longer necessary to stress the importance of nuclear power in the light of its meeting the energy demand, solving global environmental issues and its role in securing national energy. Recently, we have witnessed a positive trend in the nuclear power industry worldwide. In particular, nuclear competitiveness through a dramatic improvement in plant performance and the pursuit of plant life extension, and the subsequent atmosphere for new plant construction in the US is foreseeing the revival of the worldwide nuclear power industry. Also, the option of nuclear power has been positively reviewed as an alternative for the replacement of old reactors in Europe.

Korea Hydro & Nuclear Power Company (KHNP) was inaugurated last year, succeeding the nuclear power sector of Korea Electric Power Corporation (KEPCO), according to the restructuring plan for the Korean electric power industry. This plan's main goal is to introduce full-fledged competition in both the power generation and distribution sectors, and thus efforts have been made to enhance competitiveness among power generating companies. Korea has developed the Korean Standard Nuclear Power Plant (KSNP) according to the nuclear technology self-sufficiency program, and has continued to improve its design. In addition, we have driven forward the Korean next generation reactor project (now called APR1400), based on our operating experience and new technologies. We expect to gain cooperation from overseas organizations for successful implementation and further development of the APR1400 project, which is scheduled to begin commercial operations of the first unit in 2010.

Korea will continue a realistic level of construction of new nuclear power facilities according to its future long-term power development plan. Prerequisite for this goal is to enhance the competitiveness of nuclear power, based on improved nuclear safety and reliability. This will be the way for nuclear power to play a critical role as a sustainable energy source in the 21st century.

Which way forward or the US energy market and one way to get there

Rod M. Krich
Vice President, Licensing Projects
Exelon Nuclear, Exelon Corporation

SUMMARY:
The recently released and highly controversial US energy plan calls for 1200 new power plants over the next twenty years. While the accuracy of this prediction can be debated, the Nuclear Energy Institute has data that show that the installed US capacity has remained level at about 700 gigawatts for the last couple of years. At the same time, NEI forecasts a 50% increase in demand over the next two decades. While the recent spate of plant cancellations due to the depressed price of a kilowatt-hour is noted, this is trend is not expected to continue over that same time period.

Most new plants that will be built to meet this demand will be natural gas or clean-coal. The easiest type to site is natural gas: however, construction of natural gas plants will put pressure on supply. This pressure will lead to increased cost of generation resulting in higher electric bills for the end user, and consumers will, in the long run, not tolerate higher prices for electricity and natural gas. This means we must have other fuel sources for new plants, including renewables such as wind and solar. Also, efficiency improvements and power uprates are being made to nuclear plants so that an existing plant can generate more electricity while not creating increased environmental impacts. However, these sources will only supply a fraction of the future projected demand.

Nuclear is one of the limited choices for large-scale generation to meet this future demand that produces no greenhouse gases, and factors are coming into alignment that support the future deployment of nuclear power. Economic conditions are moving us to a modular nuclear power plant concept. One advanced technology that meets this market constraint is the Pebble Bed Modular Reactor. The inherently safe PBMR reduces dependence on redundant backup systems thus, we expect, greatly reducing the costs of constructing and operating the plant.

Liberalization of the UK Electricity Market: Current Status and Future Plans

Steven G. P. Brosnan
Executive Director, Energy Sales and Trading
Magnox Electric plc

Since 1989 the UK electricity market has progressed from a nationalised industry with 'cost-plus' tariffs, through privatisation with competition via an electricity pool, to the current commodity market known as NETA (the New Electricity Trading Arrangements). The speech will summarise the important milestones on this journey.

The key features of a commodity market for electricity will be discussed, including the need for a balancing mechanism and an imbalance cash-out price. The speech will also discuss how competition in the retail electricity market affects the wholesale market and vertically integrated companies.

There will be a short description of the opportunities and threats faced by participants in the NETA market and in particular, how a baseload nuclear generator should behave in such a market.

Electricity market development is influenced by a number of sometimes-conflicting government objectives: eg environmental protection, social policy and security of supply. The effects on possible future developments will be discussed.

Will Nuclear Energy be the Answer in the New Century?

James A. Fici
Senior Vice President, Nuclear Plant Projects
Westinghouse Electric Company
a BNFL Group Company

Discussion Summary

A simplistic economic model for the year 2042, the 100th anniversary of nuclear fission, will be outlined to emphasize the world's growing need for energy and electricity production. In addressing the deployment of nuclear energy to help satisfy the world's energy needs, the benefits of electricity production from nuclear power plants will be discussed in the context of today's needs and future needs. Nuclear energy's benefits can be demonstrated in three areas: energy diversity and security, economics and the environment. Information relevant to the U.S. will be provided in each of these areas, particularly the economic and competitiveness challenges in future deregulated markets. The nuclear plant designs offered by Westinghouse to meet near-term needs and those designs being developed by Westinghouse to satisfy longer-term energy needs will be briefly discussed. Will nuclear energy be the answer in the new century? An opinion will be shared on this question.

Deregulation of the Electricity Market and Nuclear Power

Tsutomu Toichi, Managing Director
The Institute of Energy Economics, Japan

Abstract

With the progress of economic globalization and the growing concerns over global warming, the goal for Japanese energy policy has been set to a well-balanced realization of "three Es" – "Energy Security," "Economic Efficiency" and "Environmental Protection." To Japan which depends on imports for nearly all of its fossil fuels, nuclear power has played an important role in the diversification of energy sources, and it has served as a "bargaining chip" toward the energy producing countries. Furthermore, a renewed nuclear power development has become indispensable to achieve the goal for the reduction of greenhouse gas emissions, which Japan had promised in the Kyoto Protocol. Under such circumstances, deregulation and liberalization of the electricity market is being promoted to reduce electricity prices with a view to enhancing the international competitiveness of Japanese industries.

However, unlike thermal power and other means of power generation, nuclear power essentially has a technological system which includes many elements incompatible with the market principle of emphasizing a short-term efficiency. Namely, the system has a high degree of uncertainty in terms of political, economic and technical issues, including the treatment of spent fuels, disposal and decommissioning measures, and the question of nuclear nonproliferation. In other words, nuclear power contains a lot of elements which would require the government's involvement. Nuclear power has been developed so far by avoiding these risks through the mask of full-cost principle, albeit incomplete. In future, however, if the electricity market is to be further deregulated, it is likely that there will be heightened political and economic risks which private companies could not tolerate. It is therefore necessary to clarify the range of risks which private companies could take, in case deregulation is further promoted.

What we should do now is to reconsider under the new social and economic environment the ideal role sharing in nuclear development between the state and the industry. Namely, the state should provide adequate conditions to help electric power companies to raise competitiveness of nuclear power through their own efforts and innovative ideas. For this purpose, the following things would be necessary: the state should play a major role in decreasing the uncertainty of back-end and decommissioning measures; nuclear power generation should be purchased preferentially in the same way as renewable energy; and preferential condition, such as low-interest loans, should be provided for the investments in new nuclear power plants.

[MEMO]

[MEMO]

April 24 (Wednesday)

Public Talks (12:45～14:45)

(at Civic Hall, 4th floor of Main Bldg.)

Since the 27th Conference held in Hiroshima in 1994, meetings have been arranged between nuclear community and local citizens, as a part of on-going efforts to make the Conferences more open to the general public. "Public Talks" will also take place in Saitama to exchange views on subjects taken up in the sessions of the Conference. Main topics will be Japan's energy and nuclear policies in general, nuclear fuel cycle program, and high-level radioactive waste issues.

[MEMO]

[MEMO]

April 24 (Wednesday)

Session 5 "To shape the future of nuclear power: Development ofadvanced and innovative reactors" (15:00～17:30 Lecture Session)

Global energy and electricity demand are expected to increase by about 50% by 2030 and almost double by 2050, which may bring great risk to the environment. In order to supply adequate energy in the future, energy sources that can meet the multiple requirements of being more environmentally friendly, economically competitive, and sustainable, are required. Efforts in nuclear research and development are focused on making full use of the technology's potential, which are lower cost, improved safety, less waste, and better resistance to nuclear proliferation.

This session, open to the public and scheduled following "Public Talks", will explore the future of nuclear technology development. After summarizing Session 1 on the first day ("Energy Policy of the 21st Century and Nuclear Power"), there will be presentations on advanced reactor development being undertaken through international cooperation, as well as on Japan's strategic R&D on commercializing fast breeder reactors and advanced light water reactors, all with the aim that nuclear power may continue to play an important role in supplying energy in the future.

Strategy for the Deployment of Pebble Bed Modular Reactor - toward the African Renaissance

David Nicholls
CEO, Pebble Bed Modular Reactor Ltd., South Africa

Development of Innovative Light Water Reactors in Japan

Yoichi Aeba
Special Advisor, Mitsubishi Heavy Industries, Ltd.

Nuclear generation, defined as a key power source for Japan, now provides one-third as much as the national total electricity. It was initially introduced to Japan that has little natural energy resources, to provide a more stable energy supply for the future. Now it serves as an important role of the energy "best mix" for Japan. Internationally, as well, increasing demand in electricity is inevitable, and the maximum use of nuclear energy – the product of human discovery and wisdom – is essential in order to sustain the economic growth and preserve the global environment.

Recently there is growing needs on achieving both economic efficiency and safety in nuclear generation. A government working group is studying a variety of innovative reactor designs to meet diversified needs, including high levels of safety and reliability, economics competitive to other power sources, energy security, and reduction in volumes of radioactive waste.

Today, I am going to outline the purpose, value, and characteristics of innovative light water reactors being developed by Mitsubishi, Toshiba and Hitachi. Taking advantage of economies of scale, in order to compete with other power sources, larger plants – higher capacities – have been developed. ABWR-II and APWR+ are 1,700-MW-class plants, which reflect improvements on conventional LWR technology. Simultaneously, medium- and small-scale reactors have also been developed. These will enable investments in construction to be more flexible on new demands in electricity. I will present three types of those small and medium reactors here. One is a small, simplified light water reactor, constructed at reduced cost and in less construction period employing simplified systems and equipment, at the same time enhanced safety. Another is the supercritical-water reactor. This is also a reactor with reduced costs through simplified equipment, and with improved generation efficiency. Third is the reduced-moderation water reactor. This is a light water reactor, highly promising ensuring energy security and reducing waste, which are the original objectives of such development.

These reactors are being developed jointly with national research institutes, universities and utilities (who will be users of those reactors), and I am confident that they will advance in nuclear technology for sustainable economic development and preservation of the global environment, not only in Japan, but for in the world.

I addition to these developments in innovative light water reactors as I introduced, I would touch on the fact that high-temperature gas-cooled reactors and metal-cooled fast reactors are also potential options for the future.

Development of Generation Four Reactors and the U.S. Strategy

Gail H. Marcus
Principal Deputy Director, Office of Nuclear Energy Science and Technology,
Department of Energy, USA

International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO)

Poong Eil Juhn
Director, Division of Nuclear Power
International Atomic Energy Agency(IAEA)

SUMMARY

This paper presents the background, objective and status of the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) of the International Atomic Energy Agency (IAEA, the Agency). The General Conference of the Agency adopted resolution [GC(44)/RES/21] in September 2000, which has invited "all interested Member States to combine their efforts under the aegis of the Agency in considering the issues of the nuclear fuel cycle, in particular by examining innovative and proliferation-resistant nuclear technology" and has also invited Member States to consider to contribute to a task force on innovative nuclear reactors and fuel cycle [C(44)/RES/22]. In response to this invitation, the IAEA has formulated INPRO project. The Terms of Reference for INPRO were adopted at the Preparatory Meeting in November 2000, in which more than 40 senior officials from 25 Member States and 4 international organizations were represented. INPRO Steering Committee, which is the decision and review body on INPRO project, officially approved INPRO project at its 1st meeting in May 2001. The General Conference of the Agency in September 2001 adopted another resolution for the Agency to do a role for development of innovative nuclear technology [GC(45)/RES/12, Tab F], which has recognized the "unique role that the Agency can play in international collaboration in the nuclear field.

Additional endorsement to support INPRO was made in a UN General Assembly resolution in December 2001 [UN GA 2001, A/RES/56/94], that again recommended the Agency to do "the unique role that the Agency can play in developing user requirements and in addressing safeguards, safety and environmental questions for innovative reactors and their fuel cycles" and that stressed "the need for international collaboration in the development of innovative nuclear technology".

As of March 2002, 13 Member States and the European Commission have become members of INPRO. In total, 16 cost-free experts being nominated by these Member States and the European Commission are working for INPRO project in the IAEA. Two INPRO Steering Committee meetings were held in 2001 (May and December) and another two meeting are schduled in 2002 to review the progress of INPRO.

The objective of INPRO, which composes of two phases, is to support safe, economic and proliferation resistant use of nuclear technology, in a sustainable manner, to meet the global energy needs in the next 50 years and beyond. The current 1st phase of INPRO is focussing selection of criteria and development of methodologies and guidelines for the comparison of different concepts and approaches, taking into account the compilation and review of such concepts and approaches, and determination of user requirements in the areas of resources,demand and economics; safety; spent fuel and waste; non-proliferation; and environment. Upon completion of the 1st phase of INPRO by the end of 2002, the result will be reported to and discussed at the Agency's " International Conference on Innovative Technologies for Nuclear Reactors and Fuel Cycles" to be organized in 2003. Thereafter, the 2nd phase INPRO may be initiated to examine the feasibility of commencing an international project on innovative technology development.

Prospects for Commercialization of Fast Breeder Reactors; from Strategic Study for Commercialization of FBR Fuel Cycle System

Kiyoto Aizawa
Executive Director
Japan Nuclear Cycle Development Institute (JNC)

Abstract

Commercialization of FBR cycle system is the subject of great importance to be tackled with intensive long-term efforts from the viewpoint of the vital requirements, such as: the sustained and enduring assurance of energy security, establishment of the recycling-oriented society for preserving and improving global environment, and preparedness to other diverse needs for our future society. Commercialization of this technology is expected to bring about a great benefit not only in our country but also in many countries facing with increasing energy demand.

Towards establishment of the strategic planning for the future energy technology, Japan Nuclear Cycle Development Institute (JNC) has carried out a research program named "Feasibility Study on Commercialized FBR Cycle Systems; Feasibility Study", since 1999, under intimate collaborations with Japanese electric utilities, Central Research Institute of Electric Power Industry (CRIEPI), Japan Atomic Energy Research Institute (JAERI) and other domestic/abroad research organizations. The main mission of this program is to create promising candidate concepts of FBR cycle systems with concrete engineering background and to design the development strategy for commercialization. Significance of the Feasibility Study is stated clearly in "The Long-Term Program for Research, Development and Utilization of Nuclear Energy" decided by Atomic Energy Commission of Japan in November 2000.

Phase-I Study for the first two years of this program has been devoted to delineation of system characteristics, construction of plant concepts and investigation of R&D strategy through comparative evaluations of wide system technologies and technical options, where setting safety assurance as a major premise, main emphases have been placed on achieving the economic competitiveness with the LWR cycle and other state-of-the-art power sources, as well as on featuring inherent merits and advantageous potential of the FBR cycle system with regard to capability of reducing environmental burden, efficiency in resource utilization and proliferation resistance. In Phase-I Study, several design concepts for fast reactor and fuel cycle are extracted as candidate systems according to the abovementioned research orientation, while some of these concepts indicate good perspectives on the economic performance. The study have clarified basic characteristics of large- and medium-sized reactor concepts suited for the base power

use and of small-sized reactors effective in distributed power and multi-purpose uses. The study has also revealed adequate combination schemes with fuel cycle processes compatible with these reactor systems. In Phase-II Study started in 2001, with increased weight for developing and introducing innovative technologies, intensive design effort for the candidate systems is being made in association with experimental activities on key technologies. It is planned in this phase to reinforce system consistency and technical compatibility in the fully integrated scope incorporating the radioactive waste management (treatment and disposition) into the reactor and fuel cycle systems, and consequently to narrow down the present candidates into a few promising concepts. Concerning the TRU burning and LLFP transmutation technologies as effective methods to reduce environmental burdens, we intend to develop and introduce them on the step-by-step basis judging the balance between the cost and social needs from the long-term viewpoint.

In conclusion, the present status of the Feasibility Study reconfirms that the commercialization of the FBR cycle technology as an innovative and most closed energy system is highly beneficial in fulfilling crucial future requirements: achievability of the safety and economic competitiveness, the minimization of waste generation and environmental impacts, and the sustainable resource conservation. Also it is found that the fast reactor and related fuel cycle technologies have predominant potentials for answering flexibly to various needs in the future society such as multi-purpose and distributed power uses. It is now recognized that for accelerating this R&D program further efforts would be necessary to establish the active implementation system open to domestic and international fields, ensuring the flexibility and transparency of the project management.

[MEMO]

List of Member of the Preparatory Committee for the 35th JAIF Annual Conference

Short Biography of Chairmen, Speakers and Panelists

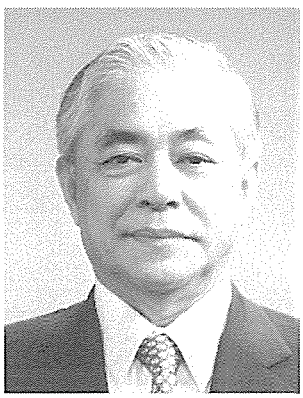
Members of the Preparatory Committee for the 35th JAIF Annual Conference

Chairman :	Katsuhiko Suetsugu	Secretary General, Asia-Pacific Energy Forum
Members :	Teruyuki Aoki	Executive Vice President and Director, Chubu Electric Power Co., Inc.
	Michio Ishikawa	Superior Adviser, Nuclear Power Engineering Corporation
	Yohji Uchiyama	Proffesor, Institute of Engineering Mechanics and Systems, University of Tsukuba
	Toshio Okazaki	Vice President, Japan Atomic Energy Research Institute
	Marino Osami	Director, Japan Consumers' Association
	Isami Kojima	Vice Chairman, the Federation of Electric Power Companies
	Shunsuke Kondo	Professor, Department of Quantum Engineering and Systems Science, University of Tokyo
	Jun Tateno	Professor, Faculty of Commerce, Chuo University
	Yasuo Nakagami	Vice President, Japan Nuclear Cycle Development Institute
	Taizo Nishimuro	President, the Japan Electrical Manufacturers' Association
	Yohsaku Fuji	President and Director, Kansai Electric Power Co., Inc.
	Miyako Matsuda	Life and Environment Analyst
	Nobuya Minami	President, the Tokyo Electric Power Co., Inc.
	Hiromichi Yokoyama	Editorial Board, the Mainichi Newspapers
Observers :	Akira Nakanishi	Deputy Director General, Research and Development Bureau, Ministry of Education, Culture, Sports, Science and Technology
	Hideo Morimoto	Deputy Director General, Planner for Nuclear Energy Policy, Agency for Natural Resources and Energy, Ministry of Energy, Trade and Industry

OPENING SESSION

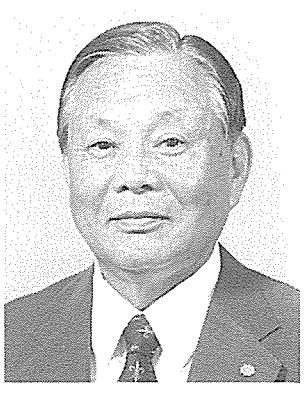
Tsutomu Kanai

Date of Birth: February 26, 1929
Education:
March 1953 Graduated from Faculty of Engineering of University of Tokyo
March 1958 Got a master's degree in Engineering of University of Tokyo
September 1960 Got a Doctor of Engineering of University of Tokyo
Occupational Career:
May 1958 Joined Hitachi Ltd.
February 1970 Manager of Nuclear Power Development department
June 1981 General manager of Hitachi Works (Heavy Industrial Plant)
June 1985 Corporate Officer and Director, General manager of Electric power Systems Group
June 1987 Senior Vice President and Director
June 1989 Executive Vice President and Director
June 1991 President and Director
June 1999 Chairman of the Board and Director
Major Governmental and Official Post:
· A member of governing board of New Energy and Industrial Technology Development Organization (NEDO) from October 1996.
· A member of Electricity Utility Industry Council of The Ministry of Economy, Trade and Industry from February 1997
· Chairman of The Industrial Property Council of The Japan Patent Office from June 1998.
· Singapore Economic Development Board International Advisory Council member from January 1995. After that, emeritus member from January 1999.
· Chairman of The Japan Accreditation Board for Conformity Assessment from April 1999.
· Chairman of Japan Consumer Credit Industry Association. from June 2000



Jun-ichi Nishizawa

Date of Birth:September 12, 1926
<Education>
1953-1954 Research Assistant, Research Institute of Electrical Communication, Tohoku University
1954-1962 Assistant Professor, Research Institute of Electrical Communication, Tohoku University
1962-1990 Professor,Research Institute of Electrical Communication, Tohoku University
1968- Director,Semiconductor Research Institute, Semiconductor Research Foundation
1983-1986 Director, Research Institute of Electrical Communication, Tohoku University
1989-1990 Director, Research Institute of Electrical Communication,Tohoku University
1990 (Mar.) Retirement from Tohoku University
1990 (Apr.) Emeritus Professor, Tohoku University
1990-1996 President, Tohoku University
1996- Project Leader, Sendai Research Center,Telecommunications Advancement Organization of Japan
1997- Director, Tohoku Independent Comprehensive Training Center
1997- Honorary President,Miyagi University
1998- President, Iwate Prefectural University
2000 (Jun.)
Chairman, Japan Atomic Industrial Forum, Inc.
<Award and Conferment>
Japan Academy Prize (1974), Person of Cultural Merits (Bunka-Korosha) conferred from Japanese Government(1983), Jack A, Morton Award from Institure of Electrical and Electronics Engineers(IEEE,U.S.A.) (1983), Honda Prize from Honda Foundation (International Prize) (1986), The International Organization of Crystal Growth (IOCG) Laudise Prize *(1989)*, The Order of Cultural Merits *(Bunka-Kunsho)* conferred from Japanese Emperor *(1989)*, *2000 IEEE Edison* Medal(2000),
<Academic Activity and Honorary Membership>
Foreign Member of the Russian Academy of Sciences (1988), Foreign Member of the Polish Academy of Sciences(1994), Member of the Academy(1995), Honorary Foreign Member of the Korean Academy of Science and Technology(1996)



Yoshihiko Tsuchiya

Date of Birth: May 31, 1926

Education:
1950 Graduated from Chuo University

Occupational Career:
1959-1964 Member,Saitama Prefectural Legislative Assembly (two terms)
1965-1992 Member,House of Councilors (five terms)
1970-1971 Parliamentary Vice-Minister for Defense
1979-1980 Minister of State Administering the Environment Agency
1985-1986 Secretary-General,Association of the Liberal Democratic Party Members of the House of Councilors
1988-1991 President, House of Councilors
1991-1992 Senior Advisor,LDP
1992.7 Governor,Saitama Prefecture
1996.7 Reelected for second term as Governor
1996.11 President,National Governors' Association
1999.5 Reelected for second term as President of the National Governor's Association
2000.7 Reelected for third term as Governor,Saitama Prefecture

Decoration:
Spring,1999 Grand Cordorn of the Order of the Rising Sun,Paulownia Flowers

Katsuhiko Suetsugu

Mr. Katsuhiko Suetsugu, born in Tokyo in 1939. A 1963 graduate of Waseda University with a B.A.degree of Political Economy, he entered the Nihon Keizai Shimbun (The Nikkei) as a writer. In 1968, he received the Association of Japanese Newspapers annual award for his reporting on the capital-liberalization of the Japanese automobile industry. He was a visiting Research Fellow for East Asian Studies at Harvard University (1977-1978); was a member of the Board of Editorial Writers on Resources, Energy, Heavy Industry and Related Policies (1979-1994); became a columnist for The Nikkei (1989); served as a lecturer at the Shibaura Institute of Technology (1990-1992) and is an Honorary Associate of The Nikkei (June 1994 - Present). In July 1994, he took on the position of Fellow at the Center for Business & Government, Kennedy School of Government, Harvard University and was Director of the East Asian Electricity Restructuring Forum (EAERF) at the university. He is Secretary General of Asia-Pacific Energy Forum (APEF), a non-profit, private research and opinion group on energy and environment issues focusing on the Asia-Pacific region.

Since 1984, he has been an Energy Policy Council Member of the Japanese Government. He has also sat on numerous councils of MITI: The Council of the Coal Mining Industry, Council of the Petroleum Industry, Council of Industrial Structure, Council on the Public Power Utility Industry; Council on the City Gas Industry; Advisory Committee to the President of the Overseas Economics Cooperation Fund (OECF); Energy Policy Promotional Committee. He served as Japan's delegate to the Mineral and Energy Forum for Pacific Economic Cooperation Committee (PECC) and APEC EWG. He is currently a member of the Council of Integrated Energy Policy (Sogo Energy Chosakai) and since September 1995, he has been a member of the Council on Official Development Aid (MITI). He has also contributed his expertise as a speaker to many publicly-sponsored international symposia and is a regular speaker for SPEC and the International Association of Energy Economics.

He has authored, co-authored and translated numerous publication including "Liberalization of Japan Automobile Industry" (1970, Co-author), "Social Economy of Resources Recycling" (1974, Co-author), "The Ford Foundation's Energy For the Future" (1977, Translator), "Inter-Fuel Competition: Re-organization of the Energy Industry Structure" (1982, Co-author), "Energy Reform" (1994, Author), which was awarded the Energy Forum's prize and International Trends and Energy Security ("The Choice of the 21st Century", 2000, Co-author). Most recently, his paper on 'An Energy Strategy for Japan' (full text) was introduced in Sekai (June 2001 Issue).

Mr. Suetsugu is a member of Japan National Press Club and National Press Club in U.S.A. //

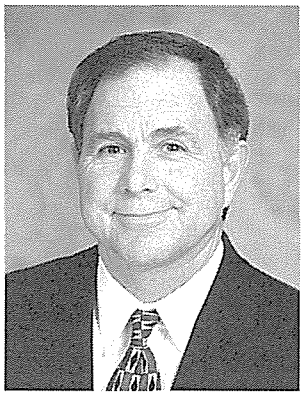
SESSION 1

Yohsaku Fuji

Date of Birth: September 14, 1937

Education:
March 1960 Graduated from the Faculty of Engineering,Kyoto University

Professional Career:
April 1960 Joined The Kansai Electric Power Co.,Inc.
Dec. 1977 Manager,Corporate Planning Department
June 1978 The World Bank.
Power Engineer,South Asia Projects Department
Oct. 1981 Back to The Kansai.Manager,Corporate Planning Department
June 1987 General Manager,Corporate Planning and TQC Office
June 1989 Senior General Manager
June 1993 Board Director
June 1997 Senior Managing Director
June 1999 Executive Vice President and Director
June 2001 President and Director,The Kansai Electric Power Co.,Inc.



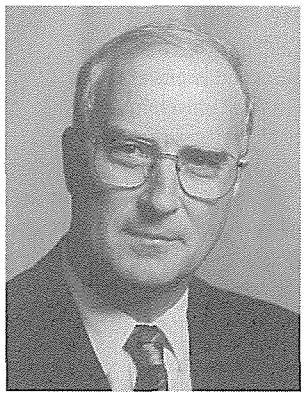
Joe F. Colvin

Joe Colvin is president and chief executive officer of the Nuclear Energy Institute (NEI), the nuclear energy industry's Washington-based policy organization. Mr. Colvin assumed his current position in July 1996. He was elected president and chief operating officer in March 1996 after serving two years as the Institute's executive vice president. Prior to joining NEI, Mr. Colvin was president and chief executive officer of the Nuclear Management and Resources Council (NUMARC).

From 1980 to 1987, Mr. Colvin held several senior management positions with the Institute of Nuclear Power Operations in Atlanta, Georgia. Before joining INPO, Mr. Colvin served 20 years in the United States Navy as a nuclear submarine officer.

Mr. Colvin currently serves on the board of directors of Cameco Corporation an international uranium and gold mining Company, and a number of energy-related groups. He is also a member of the U.S. Chamber of Commerce's Association Committee of 100, the Heritage Foundation's President's Club, etc.

Mr. Colvin holds a bachelor's degree in electrical engineering,with honors, from the University of New Mexico, has completed advanced studies in nuclear engineering, and is a graduate of Harvard University's Advanced Management Program. He is a registered professional engineer.

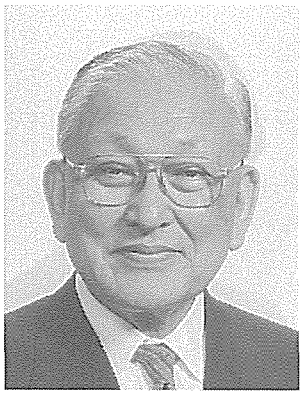


Jacques Bouchard

Date of birth : November 23, 1939
Education :
- Engineer from Ecole Centrale of PARIS (1962) - Doctorate 3rd cycle in Nuclear Physics (1964)

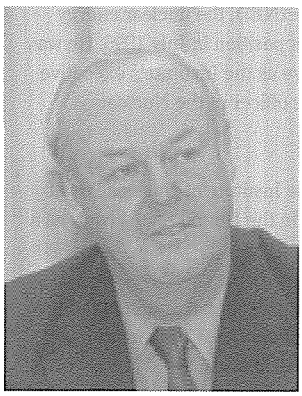
Occupational Career :
Joined the Atomic Energy Commission (CEA) in 1964.
- Reactor Physics experiments at Fontenay-aux-Roses
- Head of Experimental Physic group - Fontenay-aux-Roses (1972)
- Head of Nuclear Studies department - Cadarache (1975)
- Head of Fast Neutrons Reactors department - Cadarache (1982)
- Head of Physics Research department - Cadarache (1988)
- Director of Nuclear Reactors (CEA) - Saclay (1990)
- Director of Military Applications (CEA) - Paris (1994)
- Director of Nuclear Energy (CEA)- Paris (2000)

President of the Nuclear Science Committee of the Nuclear Energy Agency (OECD) - 1991-1994
Professor of Genie Atomique at Ecole des Mines de Paris
Decorations :
- National Order of Merit - Legion d'Honneur



Yumi Akimoto

Date of Birth: March 14, 1929
Education:BS, Ph.D., Chemistry, Tokyo Bunrika University (Tsukuba University)
1958-60 Visiting Scholar and Research Chemist at Lawrence Berkeley Laboratory, University of California
1983-87 Lecturer at Tokyo University, Faculty of Engineering (non resident)
Occupational Career:
1960 R&D on nuclear fuel cycles, electronic materials production and new metal refining, Mitsubishi Materuals Corporation(MMC)
1974 General Manager, Nuclear Fuel Cycle Dept., MMC
1976 General Manager, Nuclear Energy Dept., MMC
1981 Managing Director, MMC
1986 Senior Managing Director, MMC
1992 Executive Vice President, MMC
1994 President and CEO, MMC
2000 Chairman, MMC
1998- present President, Mitsubishi Nuclear Fuel Co. Ltd.
Committees, Industry bodies & professional associations:
- A Member, The Engineering Academy of Japan
- Senior Fellow, Atomic Energy Society of Japan
- Councilor, the Atomic Energy Commission, Japan
- Chairman, Advisory Committee for Natural Resources and Energy Mining Committee
- A member, Expert Panel on Promotion Strategy of Prioritized Areas, Council for Science and Technology Policy
- Chairman, Committee on Energy & Resources, Keidanren, Japan
- Chairman, Japan Cement Association
- Chairman, Japan Fine Ceramics Association, etc.



Norman Askew

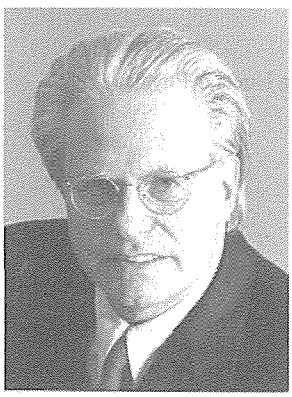
Born in 1942, Norman Askew was educated at Durham University, Aston University and the London School of Business.

He started his career at the TI Group where he became president and managing director of TI Aerospace and Titeflex International, responsible for the aerospace and automative operations in the USA, Canada, France and the UK.

Norman was appointed Chief Executive of East Midland Electricity in 1994 and from there was appointed President and Chief Executive Officer of Virginia Power in 1997. During this period he also served as executive vice president of Dominion Resources, the parent company of Virginia Power. During his time in the USA he was responsible for two nuclear power plants which were amongst the top of the US safety league.

Norman was appointed Chief Executive of British Nuclear Fuels plc on 1 March 2000. He is also Chairman of Henlys Group plc, a manufacturer and distributor of public service vehicles in the UK, Far East and North America.

He is married with a son and two daughters. His leisure interests include fell walking, ski-ing and golf



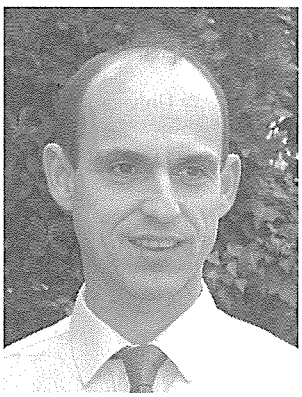
Peter Haug

Dr. Peter Haug is Secretary General of the European Atomic Forum (FORATOM) and of the EuropeanNuclear Society (ENS). FORATOM is the Brussels-based trade association for the nuclear industry in Europe, while ENS is the learned society for Europe's nuclear scientists and engineers. Dr. Haug has a Ph.D. in theoretical nuclear physics and spent two years as an assistant university professor before making a move into the business world, where he held a series of managerial positions. He became Secretary General of the German Atomic Forum in 1975 and has been associated with the nuclear industry ever since. As head of the German Atomic Forum and of the German Nuclear Society, he has been responsible for managing a wide range of actions involving public affairs and public communications in the nuclear energy field. Dr. Haug took up his new appointments with FORATOM and ENS in 2001.

Leonid A. Bolshov

Education:
1964 - 1970 M.V. Lomonosov Moscow State University (MSU), physicist
1973 Ph.D. in physics and mathematics
1982 Doctoral thesis in physics and mathematics
Occupational Career:
1970 -1973 I.V. Kurchatov Institite of Atomic Energy, junior researcher
1973 -1991 Branch of I.V. Kurchatov Institute of Atomic Energy, senior researcher, head of laboratory
1985 Professor, "Physical Electronics" specialization, MSU
1991- present Director of the Nuclear Safety Institute, Russian Academy of Sciences (IBRAE RAN)
1997 Associate Member of the Russian Academy of Sciences
Public scientific activity :
- Member of the Bureau of the Department of Power Physics and Engineering Problems, Russian Academy of Sciences
- Deputy Chair of the Nuclear Power Council at the Department of Power Physics and Engineering Problems, Russian Academy of Sciences
- Member of the Scientific and Engineering Council at the Russian Federation Ministry of Civil Defense Affairs, Situations of Emergency and Elimination of Consequences of Natural Disasters
- Chair at the Moscow Physics and Engineering Institute (Problems of safe development of modern power technologies)
- Editorial board member in "Surface, Physics, Chemistry" journal

Awards:
- 1988 Laureate of USSR State Prize in Science and Engineering
- 1997 Order of Courage for participation in elimination of Chernobyl accident consequences



Bruno Comby

Bruno Comby, born in 1960, is the founder and President of EFN, the association of Environmentalists For Nuclear Energy (www.ecolo.org).

His scientific background includes graduating from Ecole Polytechnique in Paris and a post-graduate as nuclear physicist from the National university of Advanced Technical Sciences (ENSTA) of Paris.

He is the author of several scientific publications. He then specialized in preventative health and protecting the environment. He created and is the director of the Bruno Comby Institute (www.comby.org) and wrote 8 books translated in 10 languages (one million readers) on better nutrition, prevention of tobacco and addictions, environmental problems, protein for the third world, and his latest book, the bestseller "Environmentalists For Nuclear Energy" has been published in French, English and recently published in Japan.

He is often invited in the media, television, and radio (more than 1500 TV radio and press articles) to speak about energy, health, and the environment.

Nobuya Minami

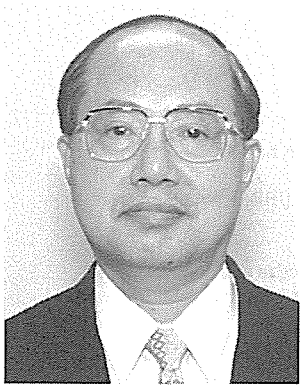
Date of Birth: November 15, 1935

Education: 1958 Graduated from the Faculty of Law, The University of Tokyo,

Occupational Career:
1958 Joined the Tokyo Electric Power Co, Inc.
1977 Manager, Corporate Planning Department
1983 General Manager, Suginami Branch Office
1985 General Manager, Corporate Planning Department
1989 Director and General Manager, Corporate Planning Department & Corporate Communications Department
1991 Managing Director
1996 Executive Vice President
1999 President

Other Activities:
1999 Vice Chairman, Japan Association of Corporate Executives
2000 Chairman, The Federation of Electric Power Companies of Japan

SESSION 2



Akio Morishima

Date of birth:November 14, 1934
Current Position:Chair of the Board of Directors/President,Institute for Global Environmental Strategies(IGES)
Education:Faculty of Law,University of Tokyo,L.L.B.,1958;Harvard Law School,L.L.M.,1968
Professional Career:

1996-00	Professor,Sophia University,Japan
1994	Professor Emeritus,Nagoya University,Japan
1994-96	Dean,Graduate School of International Development,Nagoya University,Japan
1991	Visiting Professor,Leiden University,Netherlands
1988-90	Dean,Faculty of Law,Nagoya University,Japan
1998	Visiting Professor,Faculty of Law,University of British Columbia,Canada
1976-77	Visiting Professor,Harvard Law School,U.S.A.
1971-96	Professor,Faculty of Law,Nagoya University,Japan
	present chair of the Board of Directors/President, Institute for Global Environmental Strategies(IGES)

Current Involvement:
- Member,Council of Law and Institution,Ministry of Justice
- Chairman,Policy and Planning Commission,Central Council of Environment,Environment Agency
  President Association of Environmental Law and Policy
- President, Japan Association of Environmental Science,etc

Awards:
- Global 500 Award(UNEP),1996
- Environmental Protection Award(Environmant Agency),1995

Isao Shimohirao

Date of Birth: 1943

Education:

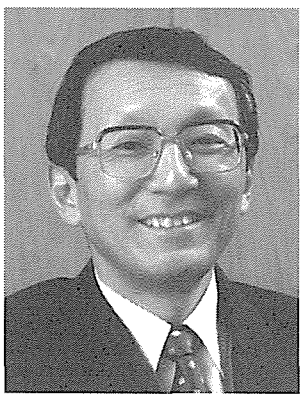
1963	Graduated from Faculty of Economics, Osaka City University
1968	Graduated from Doctor course of Economics, Postgraduate School, Osaka City University (Doctor of Commercial Science)

Occupational Career:

1969	Assistant Professor, Faculty of Economics, Saga University
1974	Assistant Professor, Faculty of Economics, Fukushima University
1980～	present Professor, Faculty of Economics, Fukushima University
2001	Chairman of Support Center for Regional Creation

Official Post:
- Chairman of Council on Synthetic Development of Fukushima Prefecture
- Chairman of Regional Council on City Planning of Fukushima Prefecture
- Chairman of Council on River of Fukushima Prefecture
- Adviser on Regional Promotion, Agency of Land

Literary Works:
He is an author of various books on economics and regional development.
2001 "Regional Promotion under Reform of Structure"(Fujiwara Shoten), etc.



Masazumi Saikawa

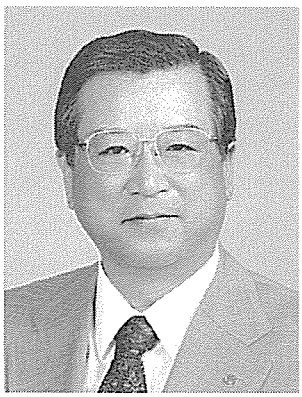
Date of Birth: March 17, 1943

Education:

March	1967	Graduated Faculty of Economics,Keio University

Occupational Career:

April	1967	Joined Nippon Yusen Kaisha (NYK)
July	1979	Joined Hakuyo-Koki Ltd.
May	1983	Member of Municipal Assembly of Kashiwazaki City (1st Term)
May	1987	Member of Municipal Assembly of Kashiwazaki City (2nd Term)
May	1987	Vice Chairman of Municipal Assembly of Kashiwazaki City
May	1991	Member of Municipal Assembly of Kashiwazaki City (3rd Term)
May	1991	Chairman of Municipal Assembly of Kashiwazaki City
December	1992	Mayor, Kashiwazaki City (1st Term)
December	1996	Mayor, Kashiwazaki City (2nd Term)
December	2000～	Mayor, Kashiwazaki City (3rd Term)



Ryuichi Hamada

Date of Birth: February 8, 1942

Education:
March 1965 graduated the Faculty of Economics, Keio University

Occupational Career:

April 1965	Joined Chubu Electric Power Co., Inc.,(CEPCO)
July 1986	Manager of Secretarial Services Department
July 1988	Deputy General Manager of Secretarial Services Department
July 1989	Deputy General Manager of Finance Department
July 1991	General Manager of London Office
July 1995	General Manager of Secretarial Services Department
June 1997	Director, General Manager of Secretarial Services Department
June 2001	Executive Director, Senior Managing Director of the Federationof Electric Power Companies (FEPCO)

Miyako Matsuda

Born in 1941

Education:
Graduated from Nara Wemen's University

Present:
Associate Professor at Fujitokoha University, College of Environment & Disaster Research
Specialist on living environment (wastes and recycling activities)
Advisory Specialist for Consumers' Affairs, designated by the Ministry of Economy, Trade and Industry

Occupational Career:
She has a number of experiences as a commission of various governmental committees, and has been involved in enactment of major recycling related laws in Japan. She has visited fourteen western countries for the last thirteen years on her own expense to study their industrial and house hold waste management policies. In Germany, she has
been conducting the observation at fixed points.
She approaches waste and recycling problems from the viewpoint of general public and speaks out aggressively on these issues. Her activities include giving lectures, writing columns, talking on television and radio programs as a commentator and so on.
The representative of 'Genki na Gomi no kai (Group of Happy Friends of Garbage)

LUNCHEON

Yukio Kurita

Date of Birth : April 6, 1930

Education:
March 1953 Graduated from Law School,University of Tokyo,

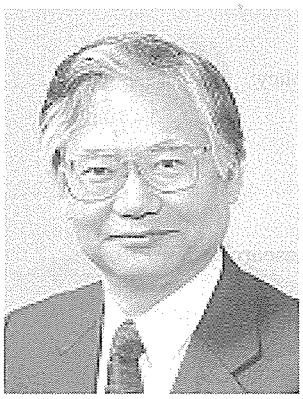
Occupational Career:
April 1955 Ministry of Home Affairs
July 1974 Director, Municipal Tax Division, Local Tax Bureau
Ministry of Home Affairs
Sept 1976 Director, Fixed Property Tax Division, Local Tax Bureau
Ministry of Home Affairs
June 1977 Inaugurated as Vice-Governor of Fukui Prefecture
April 1987 to the present Inaugurated as Governor of Fukui Prefecture
(4th term of office)

Toshio Kawatake

Date of Birth: 1924
Official Position:
- Professor Emeritus at Waseda University, doctor of letters
- Person of Cultural Merit
- Member of the Austrian Academy of Sciences (Vienna)
- Chairman of the Japan Theatre Arts Association, Chairman of the executive board of the National Arts Festival and other
- Director of Tokyo Metropolitan Foundation for History and Culture and others
- Fellow of Japan Arts Council (National Theatre of Japan), The Japan Art Association and other

Education:
1951 Graduated from Theatre Arts Major, Department of Literature, School of Literature, Waseda University
1946 Graduated from Department of Physics, Faculty of Science, Tokyo Imperial University
Professional Career:
1960 Accompanied overseas Kabuki exhibitions as a literary and artistic adviser eleven times
1990 Assumption of Professorate, Faculty of Arts and Letters, Kyoritsu Women's University
1974 Guest Professor of Vienna University
1964 Assumption of Professorate, School of Literature, Waseda University
1957 Visiting Scholar of Harvard-Yenching Institute
Awards:
2001 Cultural Order Award
2000 The Japan Art Academy Award
1996 Shin Hasegawa Award
1995 The Order of the Rising Sun, Gold Rays with Neck Ribbons
1994 The Japan Foundation Award and others

SESSION 3



Shunsuke Kondou

Date of Birth: July 26, 1942

Education:

1961-1965 Faculty of Engineering, University of Tokyo, Awarded the degree of BE in Nuclear Engineering
1965-1967 Faculty of Engineering, University of Tokyo, Awarded the degree of ME in Nuclear Engineering
1967-1970 Faculty of Engineering, University of Tokyo, Awarded the degree of PhD in Nuclear Engineering for a thesis entitled " Analysis and Evaluation of Hypothetical Core Disruptive Accident Phenomena of Liquid Metal-Cooled Fast Breeder Reactors"

Occupational Career:

1970-1971 Lecturer, Department of Nuclear Engineering, University of Tokyo
1971-1984 Associate Professor, Department of Nuclear Engineering, University of Tokyo
1984-1988 Professor, Nuclear Engineering Research Laboratory, University of Tokyo
1988- Professor, Department of Nuclear Engineering, University of Tokyo
present Professor, Department of Quantum Engineering and Systems, Science School of Engineering, University of Tokyo

Membership of Academic Societies:

•Atomic Energy Society of Japan •American Nuclear Society •Japan Institute of Electrical and Electronic Engineers
•Society for Risk Analysis, Japan Section •Society for Energy and Resources

Awards:

1992 Energy Forum Award for the book "Q&A on Nuclear Energy"
1993 Energy Forum Award for the book"ENERGIA"

Literary Works:

"Nuclear Safety"Dobunsyoin, 1990 (in Japanese). "Q&A on Nuclear Energy", ERC Pub. 1991 (in Japanese). "Energia", Denryokusinposya, 1992 (in Japanese). "Nuclear Power at the Crossroads: Challenges and Prospects for the 21st Century", T. C. Lowinger and G. W. Hinman (ed.), 1994 (Chapter 2 Japanese Policy on Nuclear Power Development and Utilization).

Yoji Uchiyama

Date of Birth: December 14, 1949

Education:

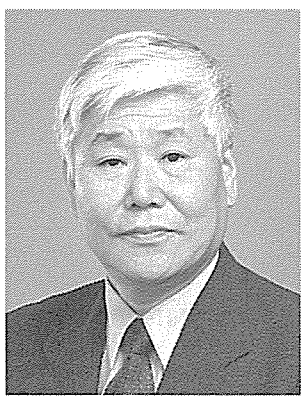
March 1976: Graduate in Metallurgical Engineering from the faculty of Engineering, Tokyo Institute of Technology , Bachelor of Engineering
March 1978: Graduate Master course in Nuclear Engineering from the Graduate school of Tokyo Institute of Technology , Master of Engineering
June 1979～August 1980: Visiting Researcher in Department of Physics, Chalmers Institute of Technology, Sweden
March 1981: Graduate Doctor course in Nuclear Engineering from the Graduate school of Tokyo Institute of Technology , Doctor of Engineering

Occupational Career:

April 1981 Enter the Central Research Institute of Electric Power Industry (CRIEPI)
September 1985～March 1987 Visiting Researcher in the Division of AdvancedPower System, Electric Power Research Institute (EPRI)in the U.S.
June 1990 Research fellow in Economic Research Center, CRIEPI
June 1992 Leader of Technological Assessment Group, CRIEPI
April 1995 Visiting Professor(concurrent post), Department of Built Environment, Graduate School of Interdisciplinary Science and Technology, Tokyo Institute of Technology (until March, 2000)
June 1997 Deputy Director of Nuclear Policy Division(concurrent post), CRIEPI
April 2001 Professor, Institute of Engineering Mechanics and Systems, the Universityof Tsukuba
Present Professor, Instituite of Engineering Mechanics and Systems, the University of Tsukuba

Academic Society Menberships:

・Japan Energy and Resources Association
・Japanese Society of Mechanical Engineering



Toshiaki Enomoto

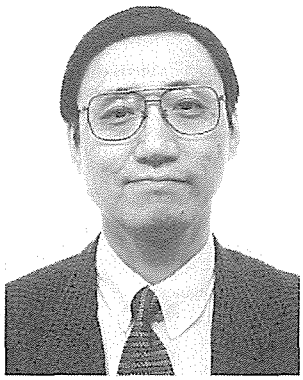
Date of Birth: July 7, 1939

Education:

March 1965 Graduated from Nuclear Engineering Department, Engineering Division, the University of Tokyo.
1990 Received Doctor Degree of Engineering from the University of Tokyo

Occupational Career:

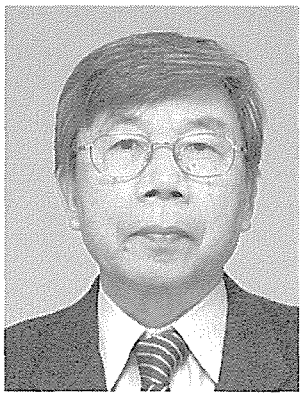
April 1965 Entered the Tokyo Electric Power Co., Inc.
July 1983 Manager, Nuclear Power Programs Section of Nuclear Power Plant Construction Department
July 1987 General Manager, Engineering Department of Fukushima Daiichi Nuclear Power Plant
December 1988 Deputy General Manager, Nuclear Power Plant Construction Department
July 1991 Deputy General Manager (Planning),Nuclear Power Administration Department
June 1994 General Manager (Planning), Nuclear Power Administration Department
June 1995 Superintendent, Kashiwazaki-kariwa Nuclear Power Plant
June 1997 Director, Deputy Executive General Manager of Nuclear Power Division and Engineering Research & Development Division
June 1999 Managing Director, Executive General Manager, Nuclear Power Division



Tatsujiro Suzuki

Education:
1975 B.E., The University of Tokyo, Nuclear Engineering
1978 M.S., Massachusetts Institute of Technology, Technology and Policy
1988 Ph.D., The University of Tokyo, Nuclear Engineering

Occupational Career:
1976 Consultant, The Boston Consulting Group, Tokyo, Japan
1981 Senior Researcher, International Energy Forum, Tokyo, Japan
1986 Visiting Scientist, Center for Energy and Environmental Policy Research (CEEPR), Massachusetts Institute of Technology (MIT), U.S.
1989 Associate Director, International Program on Enhanced Nuclear Power Plant Safety, MIT, U.S.
1994 Research Associate, Center for International Studies (CIS), MIT, U.S.
1995 Research Fellow, Socio-economic Research Center (SERC),Central Research Institute of Electric Power Industry (CRIEPI), Tokyo, Japan
1996 Visiting Associate Professor, Sociotechnics of Nuclear Energy, The University of Tokyo, Tokyo, Japan



Jun Tateno

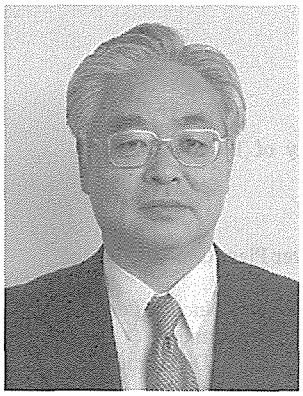
Date of Birth: 1936

Education:
1959 Graduated from faculty of applied chemistry, department of technology, University of Tokyo

Occupational Career:
1959 Joined Japan Atomic Energy Research Institute(JAERI)
1977 Professor, Chuo University

Official Post:
Head of the Research Committee on Nuclear Problems, the Japanese Scientist Council

Literary Works:
"Decomissioning Age has begun"(the Asahi Newspapers) and others
"Criticality Accident in Tokai Mura"(Shin-Nihon Shuppan, Co-author)
"Heterodox Compounds"(Otsuki Shoten)
"Q&A Plutonium"(Riberta Shuppan, Co-author)
"Power Reactor Fuels and Nuclear Fuels"(Riberta Shuppan, Co-author)



Hiroshi Noda

Date of Birth: March 10, 1946

Education:
1971 Graduate from Tokyo Institute of Technology, Master of Nuclear Engineering and work for Tokyo Electric Power Company
1983 Graduate from MIT, Master and Engineering Course of Nuclear Engineering

Occupational Career:
1992 General Manager, Power Generation Department, Fukushima Daini Nuclear Power Station, Tokyo Electric Power Company (TEPCO)
1994 Deputy General Manager, Nuclear Power Plant Construction Department at Head Office, TEPCO
1997 General Manager, Nuclear Power Engineering Department at Head Office, TEPCO
1999 Director, FBR Cycle System Development Office, Executive Office for the Policy Planning & Administration, Japan Nuclear Cycle Development Institute (JNC)

SESSION 4

Masao Nakamura

Date of Birth: April 1, 1933

Education:
Kyushu Institute of Technology(1955)

Occupational Career:
1955-59 Engineer, the Tokyo Metropolitan Government
1959- Joined The Yomiuri Shimbun
1983-96 Editorial Writer, The Yomiuri Shimbun
1996- Research Advisor of Central Research Institute of Electric Power Industry
(Member, Transport Technology Coulcil)
(Member, Industrial Technology Coulcil)

Literary Works:
Genshi Ryoku to Kankyo(Nuclear Power and Environment), ed. and co-author, The Yomiuri Shimbun Sha, Tokyo, 1975
Kisho Shigen(Meteorological Resources), Kodan Sha, Tokyo, 1976
Kisho Keizai Gaku(Meteorological Economics), PHP Institute, Tokyo, 1982
Nihon wo Sasaeru Hito to Gijutsu Ⅰ, Ⅱ (People and Technology that Support Japan), co-author, Bungei Shunju Sha, Tokyo, 1985
Koronbusu no Tamago(Columbus'Egg), Kodan Sha, Tokyo, 1987

Jeffrey S.Merrifield

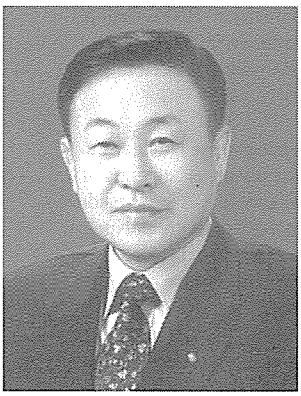
The Honorable Jeffrey S. Merrifield was sworn in as a Commissioner of the Nuclear Regulatory Commission on Oct. 23, 1998. Prior to assuming that post, he had served for several years as a senior counsel and legislative assistant to two United States Senators and as a Washington, D.C., attorney, specializing in environmental and regulatory issues.

From September 1992 to January 1995, Mr. Merrifield was an associate of the Washington, D.C., law firm of McKenna & Cuneo, where he represented a broad range of clients on environmental, contracting and regulatory issues.

In earlier service on Capitol Hill, Mr. Merrifield was a legislative assistant, first to Sen. Gordon Humphrey (R-NH), from January 1987 to December 1990, and subsequently to Senator Smith, from December 1990 to July 1992. He focused primarily on environmental, energy, transportation and agriculture issues.

Mr. Merrifield, a native of Antrim, N.H., majored in political science and history at Tufts University, where he received his Bachelor of Arts degree, magna cum laude, in 1985. After his graduation from Tufts, he organized and supervised a direct mail and telemarketing campaign that raised over $4 million for the university. He received his Doctor of Jurisprudence degree from Georgetown University Law Center in 1992.

Mr. Merrifield is married and has two sons and one daughter. He is a member of the bar of both New Hampshire and the District of Columbia.
December 1999



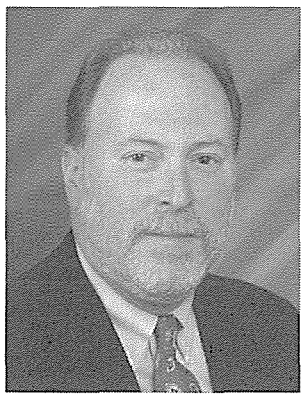
Yang-Uoo Choe

Date of Birth: April 15, 1943

Education:
B.S., Electrical Engineering, Yonsei University, Feb. 1966

Occupational Career:

Apr 1966	Joined the Korea Electric Power Corporation
Mar 1975-Aug.1982	Assistant Manager of Project Control, Wolsong Nuclear Power Div.
Sep 1982-May.1984	Manager of Electrical, Kori Nuclear Power Div.
Jun 1984-Jan.1987	Manager of Nuclear Corporate QA, Quality Assurance Office
Feb 1987-Mar.1993	Deputy General Manager, Nuclear Power Generation Dept.
Apr 1993-May1998	Site Manager, Ulchin 3&4 Construction
Jun 1998-Mar1999	General Manager, Nuclear Power Plant Construction Dept.
Mar 1999-Mar.2001	Senior Vice President, Nuclear Power Div.
Apr 2001- Present	President & CEO, Korea Hydro & Nuclear Power Co., Ltd.



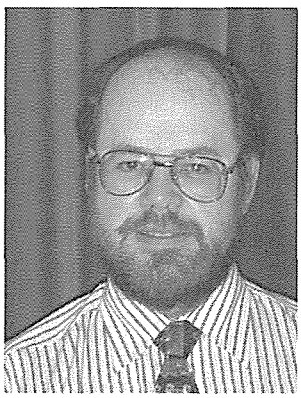
Rod M. Krich

Rod Krich during his 25 years in the nuclear power industry has held various positions in licensing and engineering. He joined the Commonwealth Edison Company in April, 1998 as Vice President, Regulatory Services and currently holds the position of Vice President, Licensing Projects. In this position, Krich has overall responsibility for leading Exelon Nuclear's licensing activities on such efforts as the Pebble Bed Modular Reactor and other future generation ventures.

In his position as Vice President, Regulatory Services, Krich was responsible for interfacing with the NRC, state regulatory agencies, and the regulatory programs area for Commonwealth Edison's corporate office and the six stations.

Prior to Commonwealth Edison, he served as manager for regulatory affairs at Carolina Power & Light Company's H.B. Robinson Steam Electric Plant from 1994 to 1996, when he was promoted to chief engineer in CP&L's nuclear engineering department. From 1988 to 1994, he was manager of the Limerick Licensing Branch at Philadelphia Electric Company's Nuclear Group Headquarters. He also had extensive licensing and regulatory experience at Virginia Power and Consumers Power Company, where he worked in the General Office and at the Palisades Plant. Krich also worked on the development of the High Temperature Gas-Cooled Reactor for General Atomics Company.

Krich received bachelor of science in mechanical engineering from New Jersey Institute of Technology in 1972. In 1973, he received his master's degree in nuclear engineering from the University of Illinois.



Steven.G.Brosnan

Steve Brosnan graduated from the University of Oxford in 1977 with an Honours Degree in Physics and earned a doctorate from the same university in 1981. Since this time he has worked for the CEGB and its successor companies in the UK electricity industry. He has specialised in nuclear power, spending the majority of his career working on the nuclear fuel cycle.

For the last four years he has been responsible for electricity trading within BNFL's nuclear generation subsidiary Magnox Electric plc. He was responsible for implementation within Magnox of changes required by the New Electricity Trading Arrangements (NETA) which commenced on 27 March 2001, replacing the electricity pool. He is on the Board of Magnox Electric plc as Executive Director, Energy Sales and Trading.

James A.Fici

As the Senior Vice President of Nuclear Plant Projects, Westinghouse Electric Company, a BNFL Group Company, Mr. Fici is responsible for providing leadership to and direction of all commercial, regulatory, quality, engineering, manufacturing and financial activities of the business unit. He was appointed to his current position in April of 2001.

Prior to his most recent assignment, Mr. Fici was Senior Vice President of the Westinghouse Nuclear Fuel business unit from 1999 to March 2001. His responsibilities entailed overseeing the business activities of the business unit's operations in Europe (Sweden and UK) and the U.S. Previously he served as Vice President and General Manager of the Westinghouse Commercial Nuclear Fuel Division. In the Commercial Nuclear Fuel Division, Mr. Fici was appointed to positions of increasing responsibility in engineering, project management, business planning, Total Quality and manufacturing. He began his Westinghouse career in 1972 as a nuclear design engineer.

Mr. Fici holds Bachelor of Science and Master of Science degrees in nuclear engineering from the University of Michigan. He serves on an advisory board for the University of Michigan's Nuclear Engineering and Radiological Sciences Department. The University of Michigan's Alumni Society awarded Mr. Fici the Merit Award in 1999 for outstanding achievements in nuclear engineering.

Tsutomu Toichi

Date of Birth: December 26, 1945

Education:

Dr. sc., Geophysics, Department of Science, University of Tokyo

Occupational Career :

1973–1983	Chief Economist, responsible for coordination and supervision of study projects related to energy supply /demand analysis, The Institute of Energy Economics, Japan (IEE)
1983–1985	Research Fellow, Energy Laboratory, Massachusetts Institute of Technology, Dispatched by IEE to research
1985–1991	Chief Economist, responsible for coordination and Supervision of study projects related to the international Oil market
1991–1994	General Manager of Research Department
1994–2000	Director , General Manager
2000– 2001	Managing Director
2001– Present	Managing Director, Chief Executive Economist

PUBLIC TALKS

Yoshiko Tsuchiya

Date of Birth: October 31, 1956

Education:
Graduated from Faculty of Law , Keio University

Occupational Career:
She has the career of newscaster, started at TV Shizuoka and later became a freelance newscaster. She has been on various TV programs as a newscaster including those of NHK.

SESSION 5

Hiromichi Yokoyama

Education:
1969 Graduated from the graduate school of science, University of Tokyo (Masters' degree)

Occupational Career:
1969 He joined the Mainichi Newspapers and worked in the Local News and Science Departments as well as holding various offices, including Assistant Chief Editor of the Science Department.
The concurrent position is Chief Editor of the Science/Environment Department and Editorial Writer.

Official Post:
- Vice President of the Japanese Association of Science and Technology Journalists
- Director of "the Society for a Bright Future for Women Scientists"
- Provisional member of the Central Environment Council

Literary Works:
"Great Research on the Next Great Earthquake"
"Mechanisms and Mysteries of Genes"
"What's happening to the Earth"

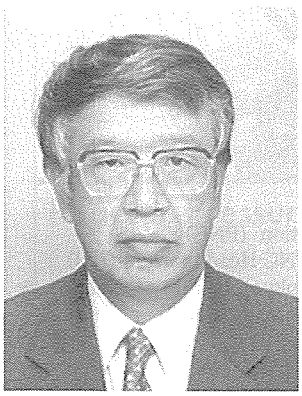
David Nicholls

Date of Birth: March 23, 1954

Education:
Royal Naval Engineering College Manadon
1973 - 6 BSc(Hons) Mechanical Engineering Royal Naval College Greenwich
1977 Post Graduate Diploma in Nuclear Reactor Technology

Occupation:
1971 - 1982 Royal Navy (Engineering Officer)
1973 1) BSc(Hons) Mechanical Engineering 2) Mechanical Engineering S/M Application Course
1977 Royal Naval College Greenwich Diploma in Nuclear Reactor Technology
1984 - 1999 ESKOM
1986 - 1989 Senior Engineer (ISI and Primary Components) ISI Program development Construction NCR Resolution (eg. SG IGSCC)
1989 - 1991 Chief Engineer (Risk Assessment) Level 1,2 & 3 PRA to support risk based licensing
1991 - 1992 Technical Support Manager (Koeberg) All engineering support to power station Operational, Modifications (Design & Implement)
1993 - 1998 Nuclear Safety Manager Independent assessment of utility nuclear activities
1998 - 2000 PBMR Programme Manager
2001 PBMR CEO

Qualifications:
- Member of Institution of Nuclear Engineers (UK)
- Member of Institution of Mechanical Engineers (UK)
- Chartered Engineer (UK)
- Professional Engineer (RSA)



Yoichi Aeba

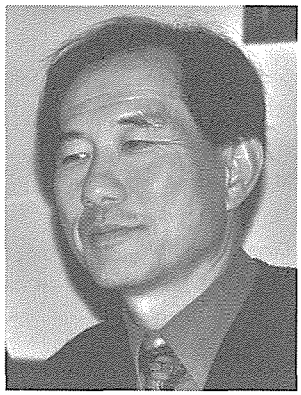
Date of Birth: February 1, 1943

Education:
March 1966 Graduated from Tokyo Institute of Technology

Professional Career:
April 1966 Joined Mitsubishi Atomic Power Industries, Inc.
April 1998 General Manager, Water Reactor Engineering Department, Nuclear Energy Systems Engineering Center, Nuclear Energy Systems Headquarters, Mitsubishi Heavy Industries, Ltd
June 1999 Director, Deputy General Manager, Nuclear Energy Systems Headquarters and General Manager, Nuclear Energy Systems Engineering Center
April 2001 Director, Chief Engineer, Nuclear Energy Systems Headquarters
June 2001 Corporate Advisor

Gail H. Marcus

Dr. Gail H. Marcus serves as Principal Deputy Director, Office of Nuclear Energy, Science and Technology, Department of Energy (DOE). In her current position, she assists William D. Magwood, IV, Director, Office of Nuclear Energy, Science and Technology, providing technical leadership for the nuclear energy programs and facilities with responsibility for development of next-generation nuclear power plants; advanced nuclear energy technologies; and producing and distributing isotopes required for medical treatment, diagnosis and research.
She served as technical assistant to Commissioner Kenneth Rogers at the NRC for over four years, providing advice and recommendations on a broad range of technical and policy issues of interest to the Commission. From this position she was detailed for five months to Japan's Ministry of International Trade and Industry, where she was NRC's first assignee to Japan, studying Japan's licensing of the Advanced Boiling Water Reactor.
She currently serves as President of the American Nuclear Society (ANS).
She is a former member of the National Research Council Committee on the Future Needs of Nuclear Engineering Education. She served three terms on the MIT Corporation Visiting Committee for the Nuclear Engineering Department.
Dr. Marcus has an S.B. and S.M. in Physics, and an Sc.D. in Nuclear Engineering from MIT. She is the first woman to earn a doctorate in nuclear engineering in the United States.



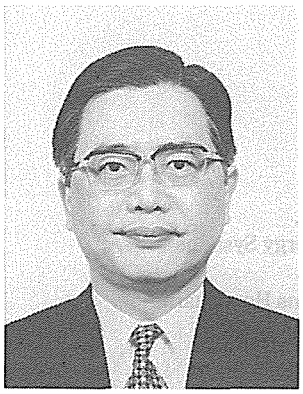
Poong-Eil Juhn

Date of Birth : May 16, 1943

Education:
1966: BS in Nuclear Engineering from Seoul National University, Korea
1973: Ms in Nuclear Engineering from Carnegie Mellon University, USA
1975: PhD in Nuclear Engineering from Carnegie Mellon University, USA

Occupational Career:

1975- 1988	: Director, Nuclear Policy Division, KAERI, Korea.
1989	: Vice President in charge of Research Reactor Development, KAERI, Korea
1989-1991	: Director General, Atomic Energy Bureau, Ministry of Science and Technology (MOST), Korea
1992-1994	: Senior Vice President, Korea Atomic Energy Research Institute (KAERI), Korea
From 1994 until today:	Director, Division of Nuclear Power, International Atomic Energy Agency (IAEA)



Kiyoto Aizawa

Date of birth: August 10, 1945

Education:

1968	Bachelor of Nuclear Engineering, University of Tokyo
1970	Master of Nuclear Engineering, University of Tokyo
1973	Doctor of Nuclear Engineering, University of Tokyo

Occupational Career:

1973	Joined Power Reactor and Nuclear Fuel Development Corporation (PNC)
1991	Senior Engineer, Reactor Technology Development Division, PNC Headquarters (HQ)
1992	Guest Professor, Research Laboratory For Nuclear Reactors, Tokyo Institute of Technology
1993	Director, Safety Engineering Division, PNC Oarai Engineering Center (OEC)
1995	Director, Advanced Technology Division, PNC/OEC
1996	Deputy Senior Director, Reactor Development Project Division, PNC/HQ
1998 (to the present)	Executive Director, JNC

PNC: former name of JNC

SHOULD WE CONTINUE TO MINE?

All energy resources are limited.
If we continue mining at this pace, they will be exhausted before long.
Remaining deposits of oil and natural gas are about 50 or 60 years,
uranium is about 70 years, and coal, which is relatively abundant, is about 200 years.
But uranium, as a fuel for nuclear power plants, can be recycled to 96% of its original amount.
When we reuse uranium, it becomes more efficient in producing power.
Up to now we have used a large quantity of fossil fuel at the expense of our environment.
For the development and posterity of our nation and the earth,
it is time to switch to more efficient, clean and long lasting nuclear energy.

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