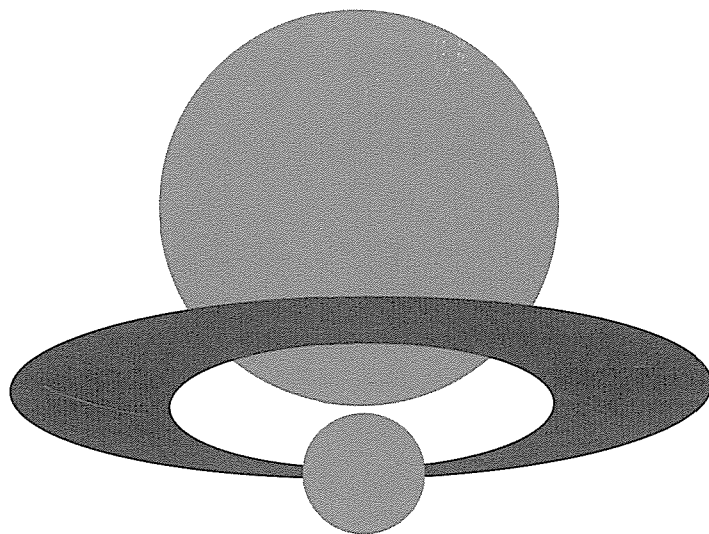


The 30th JAIF ANNUAL CONFERENCE

ABSTRACTS

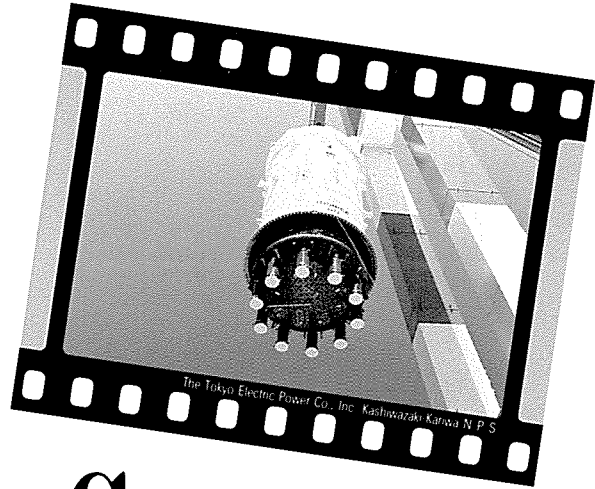


April 8-11, 1997

Tokyo International Forum

Tokyo, Japan

JAPAN ATOMIC INDUSTRIAL FORUM, INC.

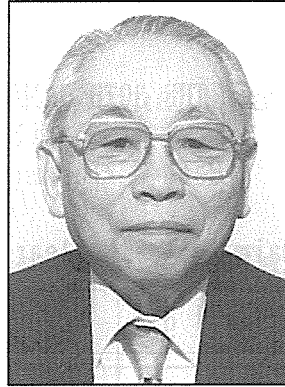


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Takashi Mukaibo
JAIF Chairman



Soichiro Tahara
Chairman of the
Program Committee

The 30th JAIF Annual Conference

Main Theme: Nuclear Energy— Let's Talk Now

Nuclear energy development and its use have been encountering many challenges, requiring untraditional thinking and methods for the overcoming efforts. Japan's domestic situation surrounding nuclear energy underscores the urgent need to improve public understandings of nuclear energy and of the significance nuclear energy carries for the country's overall energy supply.

In abroad, a new dimension with nuclear energy has arisen as nuclear materials extracted from nuclear warheads are of interest among some countries to utilize in commercial reactors. As world energy demand predicts a great increase despite limited resources, it is now the time to consider energy security at a worldwide level and environmentally acceptable.

One of the nuclear industry's tasks towards the 21st century is to create a better communication with the public, without which nuclear energy would miss its potential to serve as an effective energy source for future generations, based on technological innovation.

In view of those aspects we will hold the 30th anniversary of the JAIF Annual Conference. We encourage all of the participants to take part in lively discussions in the Conference.



THE 30TH JAIF ANNUAL CONFERENCE
April 8-11, 1997
Hall C, Tokyo International Forum

Main Theme: "Nuclear Energy—Let's Talk Now"

	Wednesday, April 9	Thursday, April 10	Friday, April 11
AM	<p>OPENING SESSION (9:00-12:00)</p> <p>[Opening Remarks] [Lectures]</p>	<p>The 30th Annual Conference Special Symposium</p> <p>"Reexamining What Nuclear Power Develop- ment Should be"</p>	<p>SESSION 2 (9:00-12:00)</p> <p>"Managing Waste Products from Energy"</p> <p>[Panel Discussion]</p>
	<p>LUNCHEON (12:15-14:00) at Hall B</p> <hr/> <p>FILMS (13:00-14:00)</p>	Lunch Break	Lunch Break
PM	<p>(14:15-14:45) [Lectures]</p> <p>SESSION 1 (14:45-17:45)</p> <p>"Alternative Energies: Roles and Prospect"</p> <p>[Panel Discussion]</p>	<p>POLITICAL DEBATE (14:00-16:30)</p> <p>"Examining the Ways to Develop Nuclear Power"</p>	<p>SESSION 3 (13:30-17:00)</p> <p>"Regional Framework for Nuclear Developing Asia"</p> <p>[Panel Discussion]</p>
		<p>DIALOGUE WITH THE PUBLIC (17:00--)</p> <p>"Life and Energy: Why Nuclear?"</p> <p>at Reception Hall</p>	

WELCOME RECEPTION
Tuesday, April 8
(19:00-20:30)
at Peacock Room
Imperial Hotel

Program of the 30th JAIF Annual Conference

April 8 – April 11, 1997

Hall C, Tokyo International Forum

Main theme: Nuclear Energy – Let's Talk Now

TUESDAY, APRIL 8

REGISTRATION(18:15–) & WELCOME RECEPTION (19:00–20:30)

at Peacock Room, Imperial Hotel

WEDNESDAY, APRIL 9

REGISTRATION(8:15–) at Hall C, Tokyo International Forum

OPENING SESSION (9:00–12:00)

Chairman:

Fumio Watanabe

Vice Chairman, Japan Atomic Industrial Forum

JAIF Chairman's Address

Takashi Mukaibo

Chairman, Japan Atomic Industrial Forum

Remarks by Chairman of the Atomic Energy Commission of Japan

Riichiro Chikaoka

Chairman of the Atomic Energy Commission
State Minister for Science and Technology

Remarks by Chairman of the Conference Program Committee

Soichiro Tahara

Journalist; Chairman of the Program Committee

Chairman:

Jiro Kondo

Vice Chairman, Japan Atomic Industrial Forum

Lectures:

"A Vision of Global Security, and the Role of Nuclear Weapons in the Twenty-first Century"

Robert McNamara

Former U.S. Secretary of Defense
Former President of the World Bank

"We in the 21st Century"

Ken Moroi

Counselor & Director
Chichibu Onoda Cement Corporation;
Member of Japan Association of Corporate Executives

"Big Fears...But Little Risks"

Elizabeth Whelan

President
American Council on Science and Health, U.S.A.

Discussion with the floor

LUNCHEON (12:15–14:00)
at Hall B, Tokyo International Forum

Remarks by Minister of International Trade and Industry
Shinji Sato Minister of International Trade and Industry, Japan

Special lecture:
"Fusion of the East and the West"
Hanae Mori The Order-of-Culture conferred designer, Japan

FILMS ON NUCLEAR ENERGY (13:00 – 14:00)
at Hall C, Tokyo International Forum

14:15-14:45

Chairman:

Kohei Abe Vice Chairman, Japan Atomic Industrial Forum

Lectures:

"Nuclear Power Development and Prospects for International Cooperation"
Victor Mikhailov Minister of the Russian Federation on Atomic Energy

"The Progress of China's Nuclear Energy Program"

Dingfan Li
Vice President
China National Nuclear Corporation

SESSION 1 (14:45–17:45) "Alternative Energies: Roles and Prospect"

Chairman:

Ryukichi Imai Professor, Kyorin University, Japan

Keynote address:

"Energy Security Issues Facing the World"

William Martin Former U.S. Deputy Secretary of Energy

Panel discussion:

Jean-Marie Bourdairé
Director
Office of Long-term Cooperation and Policy Analysis
OECD International Energy Agency

Iwane Fujii Professor, Meiji University, Japan

Kazuya Fujime Managing Director
Institute of Energy Economics, Japan

William Martin	Same as above
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Kulthorn Silapabanleng Director of Energy Research Institute
Chulalongkorn University, Thailand

Discussion with the floor

THURSDAY, APRIL 10

THE 30TH ANNUAL CONFERENCE SPECIAL SYMPOSIUM
"Reexamining What Nuclear Power Development Should Be"

Social Debate (9:00 – 12:00) "Why Are Nuclear Power Facilities Regarded
'Unwanted'"

Chairman:

Hiroyuki Torii

Editorial Writer

Nihon Keizai Shimbun, Inc., Japan

Keynote address:

"So Many Reasons for Nuclear Facilities Being Deemed Unacceptable"

Jinzaburo Takagi

Executive Director

Citizens' Nuclear Information Center, Japan

Panel discussion:

Jean-Pierre Chaussade

Technical Advisor

Communication Division

Electricite de France

Yoichi Masuzoe

Political Scientist, Japan

Nobuhiro Naito

President

The Kashiwazaki Chamber of Commerce & Industry,
Japan

Miwako Ogiso

Secretary General

Council of the People of Fukui Prefecture against
Nuclear Power

Jinzaburo Takagi

Same as above

Commentator:

Seikan Ishigai

Professor Emeritus

Osaka University, Japan

Discussion with the floor

Political Debate (14:00 – 16:30) "Examining the Ways to Develop Nuclear Power"

Chairman:

Soichiro Tahara Journalist; Chairman of the Program Committee

Panel discussion:

Taku Yamasaki Chairman, Policy Research Council
Member of the House of Representatives
Liberal Democratic Party

Shigeru Ito General Secretary
Member of the House of Representatives
Social Democratic Party

Hiroshi Kikunami Chairman, Policy and Propaganda Commission
Member of the House of Councilors
Japan Communist Party

Takeshi Noda Chairman, Policy Research Council
Member of the House of Representatives
New Frontier Party

Yoshito Sengoku Chairman, Policy Research Committee
Member of the House of Representatives
Democratic Party of Japan

Discussion with the floor

Dialogue with the Public (17:00–) "Life and Energy: Why Nuclear?"
at Reception Hall, Tokyo International Forum

Moderator:

Kazuko Tamura Senior Writer & Editorial Writer
Kyodo News Agency

Coordinator:

Kazuhisa Mori Vice Chairman, Japan Atomic Industrial Forum

Commentators:

Soichiro Tahara Journalist; Chairman of the Program Committee

Tokunosuke Nakajima Former Professor, Chuo University, Japan

Mitsuko Shimomura Journalist, Japan

Jinzaburo Takagi Executive Director
Citizens' Nuclear Information Center, Japan

FRIDAY, APRIL 11

SESSION 2 (9:00-12:00) "Managing Waste Products from Energy"

Chairman:

Hiroaki Fukami Professor of Economics, Keio University, Japan

Keynote address:

"Energy, Environment and Waste"

George Marsh Manager, Strategic Studies Department
Energy Technology Support Unit, U.K.

Panel discussion:

Michael Folger Chief Executive, U.K. Nirex

Tokunosuke Nakajima Former Professor, Chuo University, Japan

Yoshihiko Sumi Director & Executive Vice President
Kansai Electric Power Co., Ltd., Japan

Makoto Takahashi Deputy Director for Safety and Regulation
OECD Nuclear Energy Agency

Andrei Zobov Senior Associate
Carnegie Endowment for International Peace;
Chairman, Russian Chapter
Institute of Nuclear Materials Management, Russia

Commentators:

Hisashi Shinagawa Executive Director
Japanese Consumers' Cooperative Union

Yukichi Suzuki President, National Federation of Industrial Waste
Management Associations, Japan

Discussion with the floor

SESSION 3 (13:30 – 17:00) "Regional Framework for Nuclear Developing Asia"

Chairman:

Kunihiko Uematsu Executive Vice President
Power Reactor and Nuclear Fuel Development Corp.

Keynote address:

"ASIATOM—A Personal View"

Hiroshi Murata Vice Chairman, Japan Atomic Industrial Forum

Panel discussion:

Edward Fei

Deputy Director for Policy
International Policy and Analysis Division
Office of Non-proliferation and National Security
U.S. Department of Energy

Bruce Larson

General Manager, External Affairs
CRA
Australia

Y.S.R. Prasad

Chairman, Indian Atomic Industrial Forum

Chang-Saeng Shim

Vice President
International & North Korea Project Div.
Korea Electric Power Corporation

Atsuyuki Suzuki

Professor
University of Tokyo

To be announced

China

Discussion with the floor

WEDNESDAY, APRIL 9

OPENING SESSION (9:00–14:45)

Opening Remarks

Lectures

Discussion with the floor

Lectures

A Vision of Global Security, and the Role of Nuclear Weapons
in the Twenty-first Century
by Robert S. McNamara

We must not permit the 21st Century to repeat the slaughter of the 20th. The time to initiate action to prevent that tragedy is now. Three specific steps are required:

1. To reduce the risk of conflict within and among states we should establish a system of Collective Security.
2. The system of Collective Security should place particular emphasis on limiting the risk of war between or among Great Powers.
3. To eliminate the risk of destruction of nations, in the event Collective Security breaks down, we should return, insofar as practical, to a non-nuclear world.

Human beings are fallible. The indefinite combination of human fallibility and nuclear weapons carries a very high risk of a potential catastrophe.

We in the 21st Century

Ken Moroi

Counselor & Director, Chichibu Onoda Cement Corp.

Member of Japan Association of Corporate Executives

I. Human Tasks in the 21st Century

1. Settlement of Regional and Racial Conflicts
2. Control of the Population Explosion
3. Elimination of Poverty — Economic Growth in Developing Countries
4. Solutions to the Problems of Environmental Pollution and Shortages of Natural Resources, Energy, and Food

II. Role of Japan for the 21st Century

BIG FEARS..BUT LITTLE RISKS.
WHY EXAGGERATION ABOUT THE DANGERS OF MODERN
TECHNOLOGY IS HAZARDOUS TO OUR HEALTH—AND OUR
PURSUIT OF A HIGHER STANDARD OF LIVING.

Dr. Elizabeth M. Whelan
President
American Council on Science and Health

We live in an age dominated by a vast array of scientifically based technologies. Our technological know-how allows us the option of producing: a wholesome, abundant, safe and affordable food supply; life-saving pharmaceuticals; efficient, clean, affordable and safe energy supplies; and a staggering variety of consumer products that allow us more leisure, freedom and generally make our life easier.

But instead of rejoicing over the enviable standard of living our high level of technological expertise affords us, many consumers---and those reporting to them in the media--have come to fear these very life-enhancing technologies, blaming pesticides, biotechnology, nuclear energy and pharmaceuticals for cancer, birth defects, and other forms of human malady.

A growing fear of specific technologies--even though there is no scientific basis for that fear--will, inevitably, lead to the rejection of that technology. Ironically, sometimes the rejection itself will cause new health risks to appear. But since public discussions of health and alleged environmental threats to well-being are frequently emotionally charged, science and reason are omitted from the dialogue, and risk to benefit ratios become obscure.

It is incumbent on the scientific community world-wide to provide a leadership role in assisting the general consuming public to understand and quantify the spectrum of risks they hear about daily and to emphasize that there are very real health risks associated with mindlessly pursuing risks that have no basis in scientific reality. Those real health risks include a) creating health and environmental regulatory policies which are based on inverted health priorities, ones that focus on tiny or hypothetical risks, leaving no time or resources to confront the REAL public health dangers which threaten long life and good health; and b) while rejecting the hypothetical risks, we may end up embracing alternative approaches to food, energy, and pharmaceutical production--which themselves carry even greater health risks. Historically, technology, industrial wealth---and health, are highly positively correlated. Technology, wealth--and health go together. A society which rejects technology out of unfounded fear is putting its future health---and standard of living--in grave danger. In assessing environmental and technological risks, and sorting out the real ones from the remote or hypothetical ones, science, not politics, emotion and rhetoric, must dominate.

Nuclear Power Development and Prospects for International Cooperation

Victor Mikhailov
Minister of the Russian Federation on Atomic Energy

The Progress of China's Nuclear Energy Program

Dingfan Li

Vice President, China National Nuclear Corporation

LUNCHEON (12:15 – 14:00)
at Hall B, Tokyo International Forum

Special lecture

Fusion of the East and the West

Hanae Mori
Designer

Memo

SESSION 1 (14:45–17:45) " Alternative Energies: Roles and Prospect"

The world energy is inevitably bound to increase, despite our efforts for energy conservation and efficient use of energy. Environmental effects of energy use are becoming more severe, making it imperative to develop and introduce energy sources of limited environmental impact. This session deals with prospects for and roles of fossil fuel-alternative energy sources for an appropriate, stable energy supply.

Topics:

- World energy demand and future outlook
- Status of and prospects for new energy source development
- Roles of nuclear and new energies, etc.

Panel discussion

Discussion with the floor

Energy Security Issues Facing the World

William Martin

Former U.S. Deputy Secretary of Energy

Possible Implications of Kyoto (UN FCCC COP-3) on Nuclear Development

Jean-Marie Bourdairé

Director, Office of Long-term Cooperation and Policy Analysis
OECD/ IEA

Introduction: IEA as an honest and neutral broker

Part I -- Setting the Energy Frame

- three energy-related services: electricity, mobility, heat
- consequences in terms of capacity requirements for the power sector
- lessons from the past in terms of economics/politics sensitivity

Part II--Climate Change Negotiations

- the Berlin Mandate: QELROs (quantitative emissions limitations and reduction objectives)
- carbon price sensitivity: what energy related services will be affected?
- how the carbon value could be set in a global tradeable emissions permits system?

Part III--Political Challenges for Nuclear

- security of supply: diversification and the role of indigenous supply
- institutional frame: a level playing field for nuclear and renewables
- international arrangements to allow the trade of civil nuclear technologies, yet a need to cope with nuclear impediments.

Conclusion: A Global Challenges for Sustainable Development

Opinions summarized for the panel

Dr. Iwane Fujii

Energy is defined as an ability which can give any effects or influences to the surroundings or the outside. So, the environment is always affected more or less by our consumption of electric power, gasoline and so on.

Until now freely abundant usage and handling easiness for user enable us to use mainly hard energy resources represented by coal, petroleum and the like, including nuclear energy. Accordingly, our present life style and the social system are all compromised with mass consumption of hard energy resources.

On the other hand, in spite of less environmental damage by usage of soft energy resources such as wind power and solar energy, quantitative and handling restriction in use at a time have prevented our positive utilization of soft energy hitherto. Further, there remains still strong expectation for keeping the above-mentioned situation in the developed countries, whereon the peoples especially in the southeast countries having recent marked economical development also expect much to trace same process as the developed countries did.

Such a global situation is going to bring on the following problems heavily and world-widely:

- 1) Fear for rapid depletion of hard energy resources especially as oil:
- 2) Various aggravations for the global environment mostly brought by mass consumption of hard energy resources:
- 3) Much troublesome substances being accumulated day by day:

The world, however, have still no effective counterplans to avoid these difficulties and are eager for getting immediate profiles in general, which are also reflected even to the individual. Most persons have more or less interest in these problems, but most of them think that they are the last man to encounter the prospective

difficulties.

Anyway, in view of the fact that there is no way to cure the coming disease for the environment the author would like to insist on the next items here:

- I) Urgent realization of life-style and social system principally based on soft energy resources to keep sound environment where all creatures can be alive:
- II) Insurance of sustainability and stabilized energy supply through more soft energy utilization:
- III) Adequate energy saving and selective use of energy:
- IV) Expulsion of accumulation of troublesome substances:
- V) Introduction of economical efficiency involving the estimated loss for environmental aggravation:

Concrete measures to realize the above items are considered as follows:

- a)* Introduction the external cost such as CO₂ tax and the like:
- b)* Further technical development for soft energy utilization:
- c)* Establishment of clear-cut lines for disposal cost payer of waste materials:
- d)* Conversion of mass production and mass consumption to effective and saving use of every resources:
- e)* Further advancement of reuse and recycling of waste materials:

Roles and Future of Alternative Energies in Japan

Kazuya Fujime, Managing Director

The Institute of Energy Economics, Japan

1. Post-First Oil Crisis Trends of Oil Substitution

Since the first oil crisis, Japan's energy policy has underlined the promotion of energy conservation and oil substitution as its two pillars. Energy conservation in Japan has been rapidly in progress until the collapse of crude oil prices in the mid 1980s, but on the wane afterward because falling crude oil prices, combined with the strong yen, have nearly dispelled economic incentives. In regard to oil substitution, oil share in primary energy supply shrank 21.1% from 77.4% to 56.3% in FY1973-85, while the shares of nuclear and natural gas expanded 16.8% from 1.5% to 18.3% over the same period. In FY1995, oil share stood at 55.8%, down a mere 0.5% over the past decade. Nuclear and natural gas increased their shares to 22.8% in FY1995, up 4.5% over the decade, but the tempo has been slowing down. In the background, aside from their shrinking economic superiority to oil, it can not be overlooked that delays in nuclear development plans, largely due to siting difficulties, have had a considerable negative impact on the improvement of energy supply/demand mix.

2. Outlook for Oil Substitution for the Next 20 Years

(1) Primary Energy Supply

On the assumption that primary energy supply grows 1.2%/year (if GDP to go up 2.2%/year), oil supply would grow 0.5%/year and oil share in primary energy supply would go down 6.8% from 55.8% in FY1995 to 49.0% in 2015. Instead, nuclear and natural gas would increase their shares from 12.0% and 10.8% (22.8% when combined) to 14.1% and 13.7% (27.8% when combined), or a 5.0% increase, over the same period. Coal share would rise 3.3% from 16.5% to 18.9% during the same period.

Fossil fuels (oil, coal, natural gas), which amounted to 488 million kl oil equivalent and occupied 83.2% of total energy supply in FY1995, would increase 1.1%/year to 613 million kl in 2015. It means their share should drop a scant 1.6% over the next two decades. In absolute terms, fossil fuels would swell a hefty 25.6% in terms of oil equivalent. As a result, carbon dioxide (CO₂) emissions should rise 25.8%.

These phenomena stem from dragged nuclear development plans by siting difficulties (only 58 GW out of planned 70 GW achievable as of 2010). The gap should be covered by burning coal, natural gas and oil at power plants without any choice, which,

in turn, inevitably boosts CO₂ emissions (up 30% in 2010, and up 35% in 2015 over 1990 levels). As of 2010, Japan's overseas energy dependence would be 81.7%, compared with the government target set at 75.4%.

If Japan won't be able to use such nuclear advantages as a CO₂-free quasi-indigenous energy as planned, it would be a matter of great concern which can jeopardize Japan's energy security and the government policy to arrest global warming.

(2) Electricity Supply

In 1995-2015, generated output is expected to grow an average 2.2%/year. Nuclear was responsible for 33.4% of total generated output in FY1995. However, with nuclear generated output likely to grow a low 2.2%/year between FY1995 and FY2015, nuclear share would remain almost unchanged at 33.3% even as of FY2015. This represents much below 42%, the government target (for FY2010) stated in its White Paper on Nuclear.

Table Primary Energy Supply Forecast (Base Case)

Energy	Unit	FY1994 actual	2000		2005		2010		2015	
				00/94		05/00		10/05		15/10
Hydro	TWH	68.5 (2.9)	88.9 (3.5)	4.5%	95.5 (3.4)	1.4%	95.5 (3.2)	0.0%	95.5 (3.1)	0.0%
Geothermal	10,000kl	64 (0.1)	116 (0.2)	10.6%	137 (0.2)	3.3%	137 (0.2)	0.1%	138 (0.2)	0.1%
Coal	mil. t	127 (16.0)	150 (17.7)	3.0%	171 (18.4)	2.5%	187 (18.9)	1.7%	195 (18.9)	0.9%
Steaming coal	mil. t	62 (7.1)	82 (8.7)	4.8%	104 (10.2)	4.9%	123 (11.4)	3.4%	135 (11.9)	1.9%
Coking coal	mil. t	65 (9.3)	68 (9.0)	0.7%	67 (8.2)	-0.2%	66 (7.5)	-0.5%	64 (7.0)	-0.7%
Natural gas	mil. t	44 (10.8)	56 (12.7)	4.1%	64 (13.3)	2.6%	68 (13.3)	1.2%	73 (13.7)	1.5%
Nuclear	10 MW	4,037 (11.3)	4,508 (12.1)	1.9%	5,005 (12.3)	2.1%	5,800 (13.4)	3.0%	6,400 (14.1)	2.0%
New energies/others	10,000kl	640 (1.1)	712 (1.1)	1.8%	712 (1.1)	0.0%	770 (1.1)	1.6%	828 (1.1)	1.5%
Oil	100 mil. kl	3.32 (57.4)	3.31 (52.9)	-0.1%	3.48 (51.4)	1.0%	3.60 (50.0)	0.7%	3.69 (49.0)	0.5%
Total	100 mil. kl	5.77 (100.0)	6.24 (100.0)	1.3%	6.77 (100.0)	1.6%	7.19 (100.0)	1.2%	7.51 (100.0)	0.9%
Economic growth (GDP)		94/85 4.3	00/94 2.3		05/00 2.7		10/05 2.1		15/10 1.7	
Energy/GDP elasticity			0.569		0.606		0.584		0.518	
CO ₂ emissions (mil. t-C) (1990 = 100)		336.8 107.2	357.6 113.8		388.1 123.6		409.2 130.3		423.9 135.0	
CO ₂ emissions/domestic energy supply (mil. t-C/10 ¹³ kcal)		0.6308	0.6195		0.6200		0.6150		0.6371	
Per capita CO ₂ emissions (t-C/capita) (1990 = 2.54)		2.7	2.8		3.0		3.2		3.3	

(Note) In parenthesis are shares (%).

Renewables as alternative energy sources for Thailand.

Kulthorn Silapabanleng

Director, Energy Research Institute, Chulalongkorn University, Bangkok, Thailand.

Following the oil crisis in 1973, the governments of Thailand have commissioned various institutions and agencies relating to energy issues to seriously look into the possibilities of introducing renewable energy into the country's plan for energy mix. Solar, Wind, Hydro, Geothermal and Biomass have all been investigated and experimented and their economic viabilities studied

For Thailand, the total power generation was recorded at 16, 129 MW by the end of September 1996, with various types of fuels used in the electricity generation namely Natural Gas 26.8%, Fuel Oil 25.6%, Lignite 20.9%, Hydro 8.3%, Diesel 4.6% and others including renewables as remaining balance.

The first 9 months of 1996 saw Thailand's demand for electricity increased by 7.0% over the same period in 1995. The government's favorable policies towards renewables including cogeneration have been aware among the private SPP (small power producers) and this paper presents an overview of renewable fuels currently in use and their potential development.

Energy from agricultural and forestry wastes namely fire woods, charcoal, rice husks and bagasse have been used widely in rural households and small-scale industries. Cooking by fire-woods consumed some 71.5 million cubic metre in 1994. Bagasse-based cogeneration, as practices in sugar mills, used approximately 15 million of bagasse, whereas, rice husks and other agricultural wastes were used as fuels at an estimate of 46.6 million tons, in 1994.

The plan to burn municipal wastes to generate electricity in 9 provinces throughout the country is being considered. In addition, and energy crop such as cassava (tapioca) has been investigated as possible fuel for future small scale power generation. It has been found that cassava is currently uneconomically viable as fuel for power generation owing to its higher price than, say, lignite.

The Electricity Generating Authority (EGAT) has long been experimenting with wind turbines for power generation. The site at Phuket island has an average wind velocity of 5 M/S and has been installed with 4 units of wind turbine-generating sets with total combined capacity of 42.33 kwe.

Hydro power generation is by far the largest among renewables, with total installed capacity of 2,861.07 MW. The paper also looks at the availability of other renewables like solar (photovoltaic), where during the next several years, PV will be more acceptable in those remote communities which can not be served by rural electrification programme.

Memo

THURSDAY, APRIL 10

THE 30TH ANNUAL CONFERENCE SPECIAL SYMPOSIUM
"Reexamining What Nuclear Power Development Should Be"

Social Debate (9:00 – 12:00) "Why Are Nuclear Power Facilities Regarded
'Unwanted'"

Siting nuclear facilities has become a complicating issue, as a divergence of power-producing and power-consuming areas. The various schemes originally developed for siting have gradually grown inappropriate as society has changed. Efforts are required anew to allow nuclear power to coexist with local communities. This debate clarifies the reasons for nuclear power facilities to be regarded nuisance and develops possible solutions.

Topics:

- How social fairness can be pursued in nuclear power siting
- Why nuclear power facilities are not accepted
- The perception gap between siting and energy consuming areas
- Conditions allowing urban siting of nuclear power plants, etc.

Panel discussion

Discussion of the floor

So Many Reasons for Nuclear Facilities Being Deemed Unacceptable

Citizens' Nuclear Information Center J. Takagi

1. Lack of basic acknowledgement of potential risk.

A nuclear facility could potentially be a huge hazard, but nuclear industry people would not like to acknowledge this basic fact.

2. The nuclear industry always tries to evade confronting this intrinsic difficulty by spending huge some of money on subsidiaries and other nonessential things..

3. Unwillingness to publicize information. The basic position of the government and nuclear industry on information disclosure is that they disclose information only to facilitate public acceptance and they do not basically acknowledge the citizens' rights to know or freedom of information rights.

4. The nuclear industry tends to avoid arguments, and they even do not know often how to argue before the public.

5. The government and nuclear industry do not respect local residents' opinions.

Even if they got a "No" answer from the residents in a referendum, they say, "national policy is superior, and the residents' understanding is insufficient". The truth is that the government and the utilities lack a full understanding what the residents think.

6. All-out pro-nuclear policy

I can hardly understand why Japanese nuclear utilities so obstinately concentrate on advocating for nuclear energy.

7. The government and nuclear industry form the so-called nuclear family and want to decide everything inside this circle. It seems to me quite anomalous that we can never hear diverse opinions from inside the nuclear industry at least officially on subjects like the nuclear cycle policy option or reactor type strategy on which there should be varying or even splitting opinions. This also makes very ambiguous where the responsibility lies in nuclear decision making and its implementation.

Jean-Pierre Chaussade
Technical Advisor, Communication Division
Electricite de France

Nuclear Facilities Siting — Problems and Perspectives

Yoichi Masuzoe
Political Scientist

As a precondition for discussion of nuclear power generation, it is necessary to understand the world energy situation. First, we should know the estimated amount of energy reserves, such as coal, oil, and natural gas. The past two oil crises resulted from concerns over the limited supply of energy resources. Next, with rapid economic growth in Asia, energy demand has sharply increased. A third oil crisis could be triggered by this sharp increase in energy demand.

It is difficult to convince people of the necessity of nuclear power generation, without such basic information being widely shared. Since energy supply and demand is closely related to lifestyle and production methods, it may be right to declare that one's attitude toward nuclear generation is the choice of whether to continue to enjoy the benefits of today's technology or to go back to pre-modern life (or at least to reexamine today's energy-intensive lifestyle).

When a nuclear power plant is constructed, it is expected that local residents will resist it. Regarding so-called "public acceptance," it is important to consider the following points:

- (1) The entire nation's understanding and evaluation of nuclear power generation
- (2) The entire nation's understanding and evaluation of municipalities where nuclear facilities and military bases exist
- (3) The affluence of the municipality where a nuclear power plant is located; whether or not there are other important industries
- (4) To what extent safety and environmental measures are implemented
- (5) Whether or not a crisis management system is established

In recent years, public referendums have had significant effects, as in the case of Maki-machi. It is also necessary to consider this issue. A referendum based on a local ordinance is not legally binding, but politically very important. We should, therefore, try to incorporate a referendum into the present Japanese legal system.

Nobuhiro Naito
President
The Kashiwazaki Chamber of Commerce & Industry,

Miwako Ogiso
Secretary General
Council of the People of Fukui Prefecture against Nuclear Power

Memo

Memo

Political Debate (14:00 – 16:30) "Examining the Ways to Develop Nuclear Power"

The perception of nuclear power development has greatly changed in recent years. The public has come to demand a more direct role in various decision-making processes, as living standards have improved and environmental concerns have heightened. That gives rise to a greater number of factors demanding consideration when plans are being set forth. From now on, nuclear power policies must be formulated from a broader standpoint than before. This debate features representatives from Japan's major political parties, who will explore ways to carry out nuclear power development.

Topics:

- Future prospect of nuclear power in Japan (MOX, etc.) and the share of new energies in the total energy mix
- How to build a consensus for nuclear siting in increasing autonomous local face of power
- New policies for nuclear power siting
- Japan's response to increasing energy demand and environmental pollution in Asia
- Reforming governmental bureaucracy for nuclear power development, etc.

Panel discussion

Discussion with the floor

Memo

Memo

Dialogue with the Public (17:00—) "Life and Energy: Why Nuclear?"

If the human society pursued the current standards of living, energy use should be compatible with the environmental conservation. Nuclear power, developed as a primary alternative energy source to fossil fuels, has been losing public trust with the safety and policy concerned. This session is aimed to call for large public participation meet and exchange their views with nuclear professionals directly. The focus is on squarely facing the issues of nuclear power, questioning a kind of energy supply that today's lifestyle requires.

Memo

Memo

FRIDAY, APRIL 11

SESSION 2 (9:00-12:00) "Managing Waste Products from Energy"

Nuclear power has been developed as an energy source with little environmental burden. Today, with environmental concerns heightening, the effect of energy generation on environment is drawing more attention. For nuclear power, particularly, management of radioactive wastes has become an important issue. This session takes a comparative look at wastes of various energy sources, contesting nuclear power in its waste management as well as presenting an outlook for radioactive waste disposal.

Topics:

- Outlook and evaluation of wastes from various energy sources
- Significance of nuclear power from a point of environmental protection
- Current state of and outlook for radioactive waste disposal, etc.

Panel discussion

Discussion with the floor

ENERGY ENVIRONMENT AND WASTE

Dr George Marsh, Manager for Energy and Environmental Strategy, ETSU

ABSTRACT

This paper aims to give context to the debate on waste management in the energy sector by examining the range of wastes stemming from economic activities and their impacts on society (e.g. public health, social amenity) and the natural environment. To achieve this a broad definition has been adopted for waste to include emissions to the atmosphere and biosphere as well as solid waste products. Starting with a brief comparison of the quantities of waste produced from the energy sector and other industrial areas, the paper goes on to examine the nature of the wastes arising from different electricity generation fuel cycles. The impacts on society and the environment, caused by these wastes are reviewed, and methods for quantifying the damage in monetary terms are discussed. Finally the results of recent studies of external costs are used to discuss the significance of different waste streams.

In terms of mass the energy sector is an important, but not dominant, source of solid waste. For example OECD reports that in 1993 the Japanese energy sector produced 57M tonnes of waste compared to 144M tonnes from manufacturing industry and 35M tonnes from mining and quarrying. In contrast the Japanese nuclear sector produced only 876 tonnes of spent fuel. The energy sector is, however, a dominant source of atmospheric pollutants (i.e. SO_x, NO_x, particulates, etc.) and greenhouse gases. However, quantity of waste is not significant in its own right, it is the impact of these waste streams on society and the environment which is important.

When considering the social and environmental impacts of electricity generation, it is essential to examine the wastes produced over the full fuel cycle (i.e. primary extraction, transportation, preparation, conversion and transmission). Important impacts arising from these include public health, occupational health, occupational accidents, noise, visual intrusion and damage due to atmospheric pollutants (e.g. agriculture, forestry, ecosystems, fisheries, materials). Examples, drawn from the European Commission's ExternE Project, are described for impact studies of coal, lignite, oil, gas and nuclear power generation fuel cycles.

Finally, estimates of the external costs associated with the various impacts of the fuel cycles are reported. These are drawn from the ExternE Project, and also recent studies directed specifically at global warming. Although preliminary in nature, and involving a significant range of uncertainty, these results give useful indications of the causes and relative magnitudes of the key impacts of the different power generation fuel cycles. The significance of nuclear waste in comparison to other emissions from the nuclear and fossil fuel cycles is discussed.

MANAGING WASTES: A PERSPECTIVE FROM THE UNITED KINGDOM

M Folger
Managing Director
UK Nirex

In the UK, work on deep disposal since 1987 has emphasised the importance of a clear division of responsibilities between the waste agency, waste producers, safety regulators and government. Another necessary condition for securing a measure of acceptance from the scientific community and other stakeholders has been open publication of scientific studies and preliminary post-closure safety assessments of candidate sites for a repository.

These factors have been essential but do not guarantee success in building and sustaining public acceptance. A pro-active policy in explaining developments in lay terms, from local level upwards, is essential to counter critics who tend to distort particular uncertainties and issues out of context and out of proportion.

Nirex work since 1987 to identify a potential repository site is described, with a summary of promise in terms of post-closure safety.

The Nirex disposal concept - containment based on multiple physical, chemical and natural barriers - is explained, together with the structure of a client-driven approach to managing the necessary geological and safety studies.

An extensive programme of deep borehole drilling and geophysical testing has established the good promise of a preferred candidate site near Sellafield in North-West England. The geological and hydrogeological characterisation of the saturated hard rock setting are an intensive public inquiry process which ran from September 1995 to February 1996. The interactive structure of the forward programme of modelling and data analysis are described, together with the role of the proposed Rock Characterisation Facility at Sellafield. The focus is on progressively firmer assessment of post-closure risk to individuals.

Tokunosuke Nakajima
Former Professor, Chuo University, Japan

Waste and Nuclear Power (Summary)

Yoshihiko Sumi
The Kansai Electric Power Co., Inc

Global environmental problems, which are induced by wastes from human activities, may determine the fate of our planet and the survival of humankind. In addressing the problem of waste, waste management should consist of three steps:

- 1) reduction of the quantity of waste produced;
- 2) recycling or reuse of waste generated; and
- 3) safe disposal of waste which cannot be re-used.

It is also important that waste producers should be responsible for the reduction, reuse and disposal of the waste.

Following this concept, let us consider the problem of waste in connection with energy use.

Wastes arising specifically from energy production include carbon dioxide, sulfur oxides, nitrogen oxides, radioactive waste and waste heat. Among these, continuous efforts are being made to reduce the emission of CO₂, SOX and NOX to mitigate global environmental problems such as global warming and acid rain. Regarding the wastes unique to nuclear power, that is radioactive wastes, it is extremely small amounts and compact volume and is technologically controllable; this allows it to be safely managed and properly disposed.

In view of maintaining healthy environment as well as securing energy supply, the consumption of fossil fuels cannot be allowed to increase limitlessly. Therefore, conservation and more efficient use of energy in terms of energy consumption and renewable energy and nuclear power in terms of energy supply will become more and more important.

The above-mentioned three steps of waste management can be well applied to nuclear power generation. Nuclear fuel recycling can be said to be the very means that enables useful resources to be reused, and wastes to be properly disposed. Namely, spent fuel reprocessing can separate uranium, plutonium and fission products, and useful uranium and plutonium are reused as fuel and fission products as high level radioactive waste are appropriately disposed.

In terms of waste management, nuclear power will play a more important role in the next century and nuclear fuel recycling will make nuclear power a sustainable energy resource.

Radioactive Waste Management from the OECD Perspective

TAKAHASHI Makoto
Deputy Director for Safety and Regulation
OECD Nuclear Energy Agency

ABSTRACT

Various types of radioactive wastes are generated in nuclear facilities and suitable methods and strategies have been developed for the safe management of wastes: treatment and conditioning into stable forms, temporary storage awaiting disposal, dilution into the environment and disposal in near surface or underground repositories. A number of repositories for low and medium level wastes are in operation and additional ones are planned in NEA Member countries.

Recent efforts have focused on geological disposal of high level waste and spent fuel, in view of the growing volume of spent fuel under temporary storage and the return of vitrified high level waste from the reprocessing of spent fuel.

Geological disposal programmes in NEA Member countries are at various stages: conceptual study, site selection, site characterisation, development of underground laboratory, in-situ experiments and development of repositories. Development of an underground laboratory is a key step in realising geological disposal systems in order to demonstrate safety assessment models and techniques.

The priority of the NEA waste management programme reflects the situation in Member countries and that is the disposal of high level waste and spent fuel in geological formations. The vitrification technology has been well developed and four vitrification plants are in operation in NEA Member countries. The safety specifications of vitrified high level waste have been approved by the national authorities concerned.

NEA is made up of 27 Member countries from Europe, North America and the Far East and they share similar political and economical values but their social and cultural conditions are different. Member countries' political attitudes toward nuclear energy is also quite diversified. This makes NEA a suitable forum to elaborate new ideas, to solve complex issues, and to develop consensus opinions.

Overview of the current status of radioactive waste (RAW) management in

Russia

summary by Andrei ZOBOV

Carnegie Moscow Center

By 1996 there were more than 650mln cubic meters of RAW with initial radioactivity of some 4bln Ku accumulated on Russian territory. 90% of that amount was from military production and 99% of both the amount and radioactivity was of the Russian Ministry for Atomic Energy (Minatom) origin. The figures do not include RAW from nuclear weapons testing and "PNE's"

There are also nearly 9000 tons of spent nuclear fuel in Minatom and other agencies storages with the radioactivity of about 4.65 bln Ku. According to some experts RAW released into the seas around the Russian territory was initially 2.3 mln Ku.

Quite a number of experts claim that the whole waste management system in Russia is somehow far from IAEA and other international standards. There is still no proper comprehensive national list of storage and burial sites for RAW in Russia.

The pile up of RAW in military sphere resulted from the following activities:

- building-up nuclear weapons arsenal in the Minatom factories;
- operations of and repairs on nuclear powered vessels of the Navy and the Ministry for Defence Industry and their decommissioning.

Radioactive wastes from peaceful uses of nuclear energy come from:

- NPP and research reactors, storage of spent fuel and its regeneration;

civil nuclear powered ships;
use of isotopes in medicine, industry, etc.

RAW from military and civil nuclear activities are reprocessed at three plants:

Mayak at Ozersk, the Urals known for the disaster in 1957 which released 20 mln Ku over the area of 23 000 sq.km. During 40 years of its history Mayak piled up more than 1bln Ku of RAW.

Siberian Chemical Combine at Seversk with 50 considerably well isolated storages in deep geological formations down to 260-450 meters deep. Total initial radioactivity - 1.1bln Ku.

Mining-Chemical Combine at Zheleznogorsk, Krasnoyarsky krai with 800 mln Ku of initial radioactivity. All three plants are objects of recent intensive international activity to improve nuclear safety and security.

200 000m³ of wastes with 2 mln. Ku activity was of non-nuclear application origin. The management of that amount is the sole responsibility of a State Company called RODON having 16 plants all over the country and the central research base in the Bochvar Institute of Non-Organic Materials. The system is operative, successfully or not, since late 60-ties.

The importance of RAW problem: huge amount of not safely enough kept wastes creates great concern in view of the danger for the population and environment, badly needed reconstruction and modernization for which there are no sufficient funding in the budget.

An attempt to solve the problem is undertaken by recently created Federal Commission on Nuclear Wastes Management and Interagency Commission on Geologic Burial. The Government adopted a Federal Nuclear Wastes Program for 1996-2005 which named Minatom responsible for all operations within the Program. The legislation provisions on waste management are covered by the draft law "On Radioactive Wastes Management", which is expected to be adopted soon by the State Duma.

Memo

Memo

SESSION 3 (13:30 – 17:00) "Regional Framework for Nuclear Developing Asia"

For the booming economies in Asia to grow at current rates, it is essential for them to secure the necessary power sources while protecting the environment. Many countries in the area have chosen to introduce nuclear power, and are actively involved in its development. Early in the next century, more than 100 nuclear power units are expected to be in operation in the area. With Western nuclear companies stepping up activities in Asia, Japan should increasingly be interested in its further cooperation. Whether Asian nuclear power development can progress will have great bearing on global energy and environmental problems. This session discusses a cooperative regional framework for Asian nuclear energy development, with respect to its potential and requirements to be met.

Topics:

- Outlook for nuclear power development in Asia
- What kind of regional cooperation is necessary?
- Issues facing current regional cooperation (KEDO, PBNC, etc.), etc.

Panel discussion

Discussion with the floor

ASIATOM—A Personal View

Hiroshi Murata

Vice Chairman

Japan Atomic Industrial Forum, Inc.

In recent years, attention has been paid to remarkable economic growth in the Asian region, including China and the Southeast Asia, amid the stagnant economic conditions in the West and Russia. In some countries with high economic growth, the growth rate has exceeded 10 percent a year, and even the average annual growth rate is over 6 - 7 percent in the whole Asian region. Because of such rapidly growing economy and increasing population, energy consumption has also remarkably increased in the region. Especially, with modernization of local communities, electricity demand is sharply growing, at a rate of as high as nearly 15 percent a year in some countries.

To cope with such high economic growth and population increase, the nations are obliged to be more dependent on oil produced in the Middle East region. This situation may give rise to another serious oil crisis and lead to a fierce competition for oil. Regarding such prospects, many insightful people have pointed out that it is essential for the world nations to work together now to increase energy supply, especially to develop power resources quickly. Considering the environmental pollution caused by the increased use of hydrocarbon resources, we cannot but conclude that the strong promotion of nuclear power generation is the only way to go.

On the other hand, some people show concern about the assurance of safety, in the face of the Asian region's rapid growth of nuclear power generation, which requires sophisticated technology. It is evident, however, that we cannot leave the energy shortage as it is. The important task therefore is to establish nuclear safety in the Asian region. This will lead to the solution of the problem.

As for the nuclear development situation in the Asian region as of the end of 1995, 69 units were in operation, 10 units under construction, and 20 units at the planning stages. This means the region will have a total of 99 units. This number is almost equivalent to those units owned by the United States—110 units. It is expected that the Asian countries will have nearly 150 units by the middle of

the 21st century. From such a perspective, the industrialized nations are making efforts to sell nuclear power plants to the nations in the region, and are achieving considerable results.

However, to internationally cope with the rapid nuclear power development in the region, it is absolutely necessary to ensure safety and to provide the safeguards for the nuclear materials which are growing in quantity. Furthermore, with the increase in nuclear power generation capacity, it is becoming increasingly important for the nations to close the nuclear fuel cycle supporting it.

At present, only Japan and China have succeeded in closing the nuclear fuel cycle in the region. It seems to me that it is time to plan the establishment of an important regional system, namely, "ASIATOM," and to work together to realize this new system, under which we should promote the establishment of the safeguards system and the closing of nuclear fuel cycle.

The name "ASIATOM" will immediately remind us of "EURATOM," but in consideration of the differences in the history of nuclear development, regional economy, social structure, and cultures, it will not be appropriate to call this system an Asian version of "EURATOM." "ASIATOM" which I picture would have functions complementing the safeguards provided by the International Atomic Energy Agency (IAEA). At the same time, the member nations would share the nuclear fuel cycle facilities which will be needed in the region. By doing so, the nations could further strengthen the regional cooperative system to realize a sound and efficient cooperation in developing nuclear power exclusively for peaceful uses.

Regional Nuclear Cooperation and Regional Stability

Edward Fei
Deputy Director for Policy
International Policy and Analysis Division
Office of Non-proliferation and National Security
U.S. DOE

I will look at regional nuclear cooperation from the perspective of regional stability.

Northeast Asia is a region of tension and instability. Nuclear activities of states have at times greatly increased regional instability. States in the region have repeatedly sought nuclear weapons. Northeast Asia is the region of greatest risk for nuclear proliferation.

The Framework Agreement and creation of KEDO demonstrate that a great source of regional instability -- the DPRK unsafeguarded nuclear program, can become a source of regional cooperation and stability.

We should build upon the example of KEDO and the Framework Agreement. Nuclear fuel cycle activities should become a means for greater regional stability and cooperation, not greater regional conflict.

Positive steps of two types might be taken:

- Technical
- Political

These two types of positive steps should be coordinated, but can proceed independently.

Technical steps can be taken by many different organizations such as utilities, quasi-governmental organizations, laboratories, private citizens, and governments. Examples are:

- Nuclear safety cooperation
- Cooperation in spent fuel management
- Increasing regional nuclear transparency - visits, workshops, verification experiments
- International exchanges among utilities or nuclear industries
- Nuclear materials management standards
- KEDO
- US/DPRK cooperation at Yongbyong

Political Steps large or small, can create a context or framework for regional cooperation

- Declarations at meetings such as APEC or ARF
- Unilateral, Bilateral, Multilateral statements of principle
- International Agreements
- International Organizations such as Pacificatom that could provide an umbrella for specific technical actions

International nuclear cooperation should not only benefit nuclear industries, it must contribute to better understanding and relations between states in a region.

Bruce Larson
General Manager, External Affairs, CRA

Energy Scenario in India

Y.S.R. Prasad

Chairman, Indian Atomic Industrial Forum

The Role of Korea in the KEDO Project and Future Prospects in Regional Nuclear Power Cooperation

Chang-Saeng Shim
Vice President
Korea Electric Power Corporation

Summary

Asia is the most active area in the world today for Nuclear Power Plant (NPP) programs. This is due to the area's aggressive economic policies and their accompanying demands for electric power.

The nuclear power has played an important role in Republic of Korea, because of its deficit in natural energy resources. The ROK is now operating 11 nuclear units that generate 9.6 GWe, and is presently constructing 7 nuclear units that will generate 6.1 GWe, and will start construction of two more KSN-1000 units late this year.

The KSN-1000 (1000MWe) design was developed to reflect the Korean Nuclear construction and operation experience as well as to take advantage of lessons learned from around the world. The ROK is continuing to expand its commitment to its NPP Program as it forges ahead with its next generation reactor, the KSN-1300 (1300 MWe), which will adopt simpler design, increased safety features and more efficient operating characteristics. Meanwhile, we do not perform any back-end nuclear fuel cycle projects according to the "Non-Nuclear Korean Peninsula Peace" policy.

The ROK has reorganized its nuclear industry to improve efficiencies by promoting a more businesslike approach to the way it accomplishes its goals. Accordingly, the "NSSS Design" task was turned over from KAERI to KOPEC, "Radwaste Management" from KAERI to KEPCO, and "Nuclear Fuel Design" from KAERI to KNFC. Mid & long term R&D plan has been set up to maximize research efficiency with the positive participation of government, industries, institutes of higher learning and research centers.

Korea has been promoting the peaceful use of nuclear energy in the region by joining the IAEA RCA, WANO, PBNC, and etc., and sharing lessons learned, training, technical support among the participants at the level of both the Government and power companies. Among these regional cooperations, the most important cooperative project is the LWR Project.

As you might well know, the LWR project is to supply two KSNP of approximately 1,000MWe each to the DPRK by international consortium (KEDO). At present, KEDO is composed of three original members (i.e. Japan, USA and ROK) and 7 member countries (i.e. Argentina, Australia, Canada, Chile, Finland, Indonesia and New Zealand), and the accession of EU is agreed provisionally between EU and KEDO.

KEDO officially designated KEPCO as the prime contractor of the LWR Project on a turnkey basis. As the Prime Contractor, KEPCO is exerting and will continue to exert its best efforts, becoming to the "Central role of Korea", to successfully construct the KSNP within given time span with its construction experiences and technical capabilities developed through many different nuclear projects

The LWR Project is very complex and difficult due to the delicate relationship between the DPRK and the ROK, and the mixed political and commercial interests of the project sponsors. This project will require close cooperation among the project participants, and the special understanding and positive cooperation of Japan is indispensable during not only the project's implementation but also the plant's operation. With this in mind, I would like to suggest that this forum be a good chance to compose a regional cooperative body to secure the nuclear safety by plotting a course for the program to exchange technology and manpower with the DPRK at the level of non-government organization (NGO) among the countries in Asia for the safe operation of the NPP by the DPRK.

Atsuyuki Suzuki
Professor, University of Tokyo

China

Memo

Short Biography of Chairmen, Speakers, and Panelists

Member List of the Program Committee for the 30th JAIF Annual Conference

(In Alphabetical Order)

Chairman: Soichiro TAHARA
Journalist

Members: Mamoru AKIYAMA
President, Institute of Applied Energy

Kazuya FUJIME
Managing Director, Institute of Energy Economics, Japan

Ryukichi IMAI
Professor, Kyorin University

Toshiyuki KONDO
President, Power Reactor and Nuclear Fuel Development Corporation

Yasuo NAGAI
Executive Vice President, Mitsubishi Heavy Industries, Ltd.
Chairman, Nuclear Energy Steering Committee
Japan Electrical Manufacturers' Association

Tokunosuke NAKAJIMA
Former Professor, Chuo University

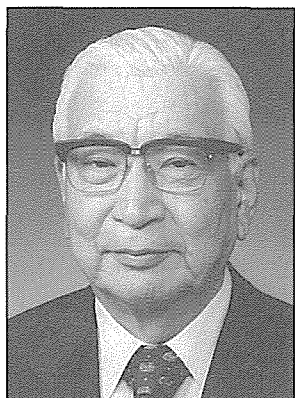
Mitsuko SHIMOMURA
Journalist

Hisashi SHINAGAWA
Executive Director, Japanese Consumers' Co-operative Union

Yoshihiko SUMI
Director & Executive Vice-President, Kansai Electric Power Co., Inc.

Hiroyuki TORII
Editorial Writer, Nihon Keizai Shimbun, Inc.

OPENING SESSION



Fumio Watanabe

Born on March 28, 1917

1939 Graduated from the University of Tokyo (Bachelor of Economics)

1939 Joined the Tokio Marine and Fire Insurance Co., Ltd.

1971 Appointed Managing Director of the Tokio Marine and Fire Insurance Co., Ltd.

1975 Appointed Senior Managing Director of the Tokio Marine and Fire Insurance Co., Ltd.

1977 Appointed Executive Vice President of the Tokio Marine and Fire Insurance Co., Ltd.

1978 Appointed President of the Tokio Marine and Fire Insurance Co., Ltd.

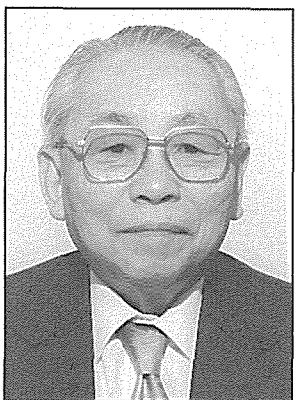
1984 Appointed Chairman of the Tokio Marine and Fire Insurance Co., Ltd.

1988- Appointed Counsellor of the Tokio Marine and Fire Insurance Co., Ltd.

Rewards :

Medal with Blue Ribbon in 1981, Grand Cordon of the Order of the Sacred Treasure in 1987.

1986- Vice Chairman, Japan Atomic Industrial Forum



Takashi Mukaibo

Date of Birth : March 24, 1917

1939 B. S. in Engineering, the University of Tokyo

1947-54, 1958-59 Associate Professor of the University of Tokyo

1954 Ph. D. in electrochemistry, at the University of Tokyo

1954-58 Science Attaché, Embassy of Japan in USA

1959-77 Professor of the University of Tokyo

1968-69 Dean, the Faculty of Engineering, the University of Tokyo

1977-81 President, the University of Tokyo

1981-91 Acting Chairman, Japan Atomic Energy Commission

1992- Chairman, Japan Atomic Industrial Forum, Inc.

1983- President, Japan Association of Engineering Education

1985- President, Japan Society for Science Policy and Research Management

1989- President, Engineering Academy of Japan

Awards: Order of Gorkha Dakshin Bahu, First Class, His Majesty a Government of Nepal (1977); Commendatore Al Merito Bella Republic Italiana (1980); Ordem Nacional do Cruzeiro do Sul, Brasil (1982); the Henry de Wolf Smyth Nuclear Statesman Award, American Nuclear Society and American Atomic Industrial Forum (1984); Ordem de rio Branco (Grande Oficial), Brasil (1988); the First Class Order of the Sacred Treasure (1989), etc.



Riichiro Chikaoka

Date of birth : September 7, 1926

Place of birth : Yamagata, Japan

Education : 1945 Military Academy

Career :

1986 Parliamentary Vice-Minister, Management and Coordination Agency

1986 Parliamentary Vice-Minister of Health and Welfare

1991 Chairman, Standing Committee on Science and Technology, the House of Representatives

Present Positions :

Minister of State for Science and Technology

Member of the House of Representatives (Liberal Democratic Party), elected six times since 1980

Member, Council for Science and Technology, an advisory body to the Prime Minister on science and technology policy in Japan

Chairman, the Atomic Energy Commission

Chairman, the Space Activities Commission



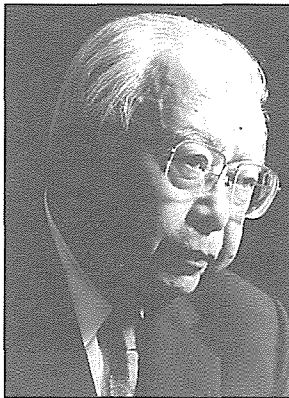
Soichiro Tahara

Born in 1934 in Hikone City, Shiga Prefecture.

After graduating from Waseda University, he joined Iwanami Movies Co. and then TV-Tokyo Broadcasting Co.

Mr. Tahara has been very energetic in extending critique of issues of broad areas related to politics, economy, industries, and advanced technologies, in mass media since he became a free-lance journalist in 1976.

He wrote many publications including "Nuclear Wars," "Japanese Bureaucracy," "Media Wars."



Jiro Kondo

Birth of Date: January 23, 1917

Education:

1940 graduated Faculty of Science, the University of Kyoto

1945 graduated Faculty of Engineering, the University of Tokyo

Career:

1958 Professor, the University of Tokyo

1975 Dean, Faculty of Engineering, the University of Tokyo

1977 Director, National Institute for Environmental Studies

1985 Member and Chairman, Science Council of Japan (the 13th)

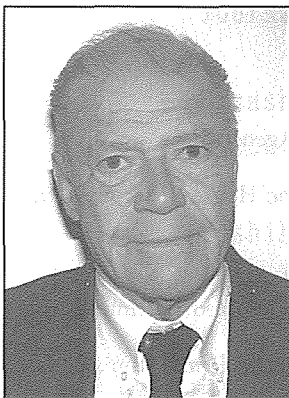
1988 Member and Chairman, Science Council of Japan (the 14th)

Commissioner, National Land Council 1990

Chairman, Central Council for Environmental Pollution Control)

Commissioner, Science Council

1994- Vice Chairman, Japan Atomic Industrial Forum, Inc.

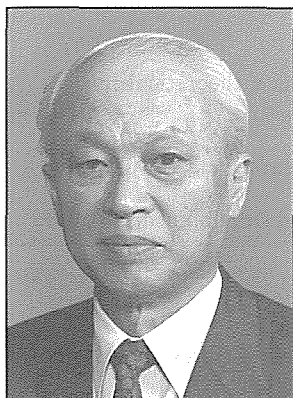


Robert McNamara

Born in San Francisco, on June 9, 1916. In 1939 he received an MBA degree from the Harvard Graduate School of Business Administration. In 1940 he returned to Harvard to become an instructor and later Assistant Professor of Business Administration. In 1943 he was commissioned a Captain in the Air Force.

Upon his discharge from the Air Force Mr. McNamara joined the Ford Motor Company. In 1957 he was elected a Director of the company. On November 9, 1960 he was elected President. At the request of President-elect John F. Kennedy, Mr. McNamara agreed to serve as Secretary of Defense of the United States and took the oath of office on January 21, 1961. He served as Secretary of Defense until March 1968. He became President of the World Bank Group of Institutions in April 1968, retiring June 30, 1981.

Since his retirement as President of the World Bank Group Mr. McNamara has served on the Boards of Royal Dutch Petroleum, the Bank of America, The Washington Post Company and Corning Incorporated, among others. He was a member of the International Advisory Committee of Goldman Sachs. Mr. McNamara is associated with a number of non-profit associations, including The Brookings Institution, etc., focusing on the issues of population and development, world hunger, the environment, East-West relations and nuclear arms.



Ken Moroi

Born on April 23, 1928 in Tokyo

1953 Graduated from Faculty of Economics, the University of Tokyo

1953 Joined the Industrial Bank of Japan, Ltd.

1967 Joined Chichibu Cement Co., Ltd.

1969 Director Chief Secretary

1971 Appointed as Managing Director of Chichibu Cement Co., Ltd.

1973 Appointed as Senior Managing Director of Chichibu Cement Co., Ltd.

1975 Appointed as Vice President of Chichibu Cement Co., Ltd.

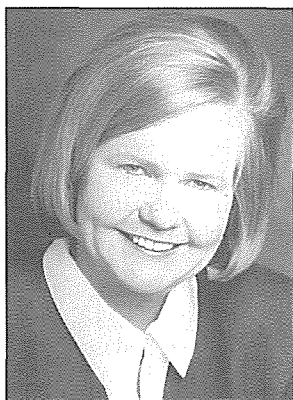
1976 Appointed as President & Representative Director of Chichibu Cement Co., Ltd.

1986 Appointed as Chairman & Representative Director of Chichibu Cement Co., Ltd.

1989 Appointed as Chairman & Representative Director of Chichibu Onoda Cement Corp.

1996- Appointed as Counselor & Director

Mr. Moroi is currently Vice President of the Japan Federation of Employers' Associations and member of Japan Association of Corporate Associates. Mr. Moroi's official posts include : member of the Economic Council ; member of the Industrial Structure Council ; member of the Tax Commission ; Chairman of the Committee for the Promotion Of Decentralization ; member of the Administrational Reform Council.



Elizabeth Whelan

Birthdate : December 4, 1943

Birthplace : New York, New York

Education : Major Areas of Study-Epidemiology, Public Health, Demography, and Biostatistics
1971 Harvard School of Public Health, Doctor of Science

1968 Harvard School of Public Health, Master of Science

1967 Yale School of Medicine, Dept. of Epidemiology and Public Health, Master of Public Health

1965 Connecticut College, B.A.

Recent Work Experience :

1990- Editor and Publisher : Priorities : For Long Life & Good Health

1989- President, American Council on Science and Health

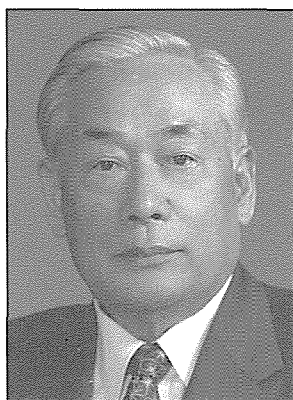
1980-89 Executive Director, American Council on Science and Health

Member, Board of Directors, Food and Drug Law Institute

Member, Board of Directors, American Cancer Society, New York Division, etc.

1980-81 Commentator, Cable News Network

Dr. Whelan wrote a number of books and articles for popular and professional publications. She also holds many positions at professional affiliations and honorary positions and awards.



Kohei Abe

Born on December 8, 1923

Education :

1949 Graduated from Kyoto University

Career :

1949 Joined Chubu Electric Distribution Co., Ltd.

1951 Joined Chubu Electric Power Co., Inc.

1975 General Manager of Accounting Department

1976 Senior General Manager

1979 Director

1981 Director and General Manager of Gifu Regional Office

1983 Managing Director

1985 Director

1989 Executive Vice President and Director

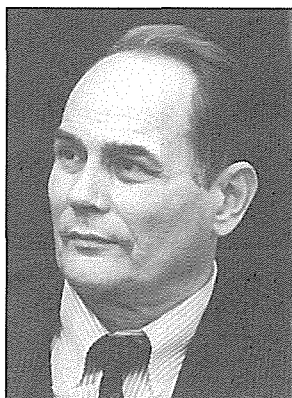
1991 President and Director

1995~ Chairman of the Board of Directors

1996~ Vice Chairman of Japan Atomic Industrial Forum

Hobbies :

Reading, golf, music listening



Viktor Mikhailov

Born on February 12, 1934 in Moscow

Education :

1958 Graduated from the Moscow Institute of Physical Engineering as a theoretical nuclear physicist

Career :

1958 Engineering, and later Head of Scientific Div., All-Union Research and Development Institute on Experimental Physics

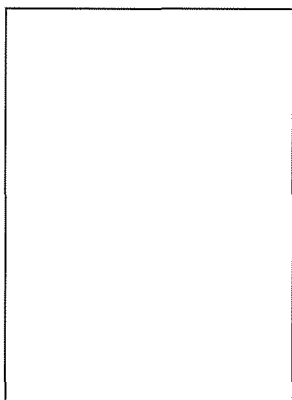
1969 Head of Div., Deputy Director, and then Director, Research and Development Institute on Impulse Technology

1988 Deputy Minister, USSR Ministry of Atomic Power and Industry

Professor, Head of Faculty, Moscow Institute of Physical Engineering

1992- Minister, Ministry of the Russian Federation for Atomic Energy

He has a doctorate in technical sciences and is a professor decorated with states awards and prizes. He wrote over 260 research papers.



Dingfan Li

Born on October 21, 1940 in Changsha City, Hunan Province

1988- Vice President, China National Nuclear Corporation (CNNC)

1986-88 Vice Minister, Ministry of Nuclear Industry

1973-86 Various positions in the Second Branch Factory in International Industry Corporation, CNNC : Deputy Section Chief for Production, Deputy Director for Production, Director for Production, Deputy Chief Engineer, Chief Engineer, Deputy Director General

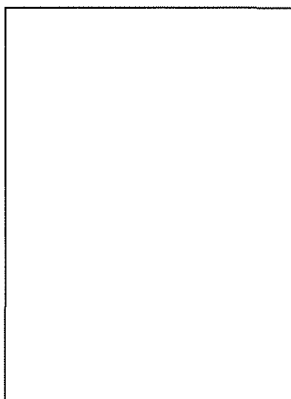
1969-73 Head of a production shift in the workshop, Section Chief, Workshop Dispatcher in Intercontinental Industry Corporation, of Ministry of Nuclear Industry (MNI)

1963-69 Technical Secretary, Lanzhou Nuclear Fuel Complex of MNI

1958-63 Study in Department of Engineering and Physics, Central China Polytechnic Institute (Central China Polytechnic University)

1991- Vice Chairman, China Association of Most Advanced Technology and Industry ; Executive Member of China Association of Enterprise Management and China Association of Enterprisers

LUNCHEON



Hanae Mori

Hanae Mori is the only Asian designer to be accepted as a member of La Chambre Syndicale de la Couture Parisienne.

Hanae Mori studied Japanese Literature at Tokyo Women's Christian College.

After her marriage, she started studying design, and in 1951 opened her studio in Tokyo. Soon she became involved in the growing post war movie industry and designed costumes for nearly 300 films.

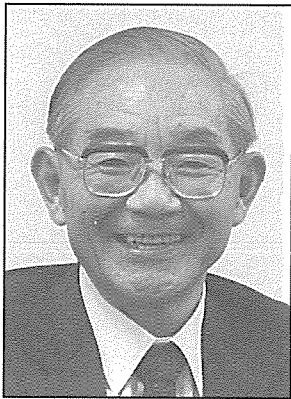
In 1965 she presented her first Collection overseas in New York. In 1975 she established herself in Europe ; she presented her Collection in Paris, where in 1977 she opened her Haute Couture Maison.

Some of Madame Mori's achievements include designs for the costumes for the opera "Madame Butterfly" at La Scala in Milan in 1985, and for the Paris Opera Ballet's "Cinderella," directed by Rudolf Nureyev in 1986. She also designed the costumes for the opera "Elektra" for the 1996 Salzburg Festival.

As a pioneer of working woman in Japan, Hanae Mori serves on many governmental committees as an advisor. Her accomplishments in connecting the East and West through fashion have earned her the title, "Ambassadress of Beauty."

She was decorated "Chevalier de la Legion d'Honneur" in France, as well as the "Order of Culture" in Japan, in 1996.

SESSION 1



Ryukichi Imai

Born in Tokyo

Education:

University of Tokyo (M. S. in mathematics), Dr. Eng. (nuclear engineering) , Harvard University (M.A.), Fletcher School of Law and Diplomacy (A.M.)

Career:

Science Reporter, Asahi Shimbun

General Manager, Engineering, Japan Atomic Power Co,

Ambassador Extraordinary and Plenipotentiary of Japan to Kuwait, Conference on Disarmament (Geneva), and Mexico

Counsellor, Atomic Energy Commission

Senior Advisor, Japan Atomic Industrial Forum

Distinguished Scholar, International Institute for Global Peace

Visiting Professor, Sophia University

Authorship: Science and Nation, Nuclear Safeguards (IISS Adelphi paper), Nuclear Power and International Politics, Nuclear Energy and Nuclear Proliferation (Westview), Disarmament II (OG & H), Nuclear Disarmament Post Cold War Management of Nuclear Weapons (1992) and others.



William Martin

William F. Martin is Chairman of Washington Policy and Analysis, Inc., an international consulting firm specializing in energy, environmental, trade and political studies and analyses. He recently was the lead author of a Trilateral Commission global energy report, "Maintaining Energy Security in a Global Context" published in September 1996.

Before founding the firm in 1988, Mr. Martin held a number of important posts in the U.S. government. At the age of 35 he was confirmed by the U.S. Senate as Deputy Secretary of Energy—the youngest Deputy Secretary of the Reagan Administration. In this capacity, he was responsible for review and development of U.S. energy policy. Mr. Martin testified frequently before the Congress on U.S. energy policy, international oil and gas assessments, FERC issues, U.S. arms control policy, electric utility deregulation and international agreements.

From 1985 to 1986 he served as Executive Secretary of the National Security Council.

Mr. Martin joined the U.S. Department of State in 1981 as Special Assistant to the Under Secretary for Economic Affairs responsible for East-West trade issues with special focus on Soviet natural gas sales to Western Europe. The following year he became Director of International Economic Affairs of the National Security Council. From 1977 to 1981, Mr. Martin was an energy economist with the International Energy Agency (IEA) in Paris. During the second oil crisis, he served as Special Assistant to IEA's Executive Director, Ulf Lantzke.

He received a BS in economics from the Wharton School of the University of Pennsylvania and an SM degree from the Massachusetts Institute of Technology.



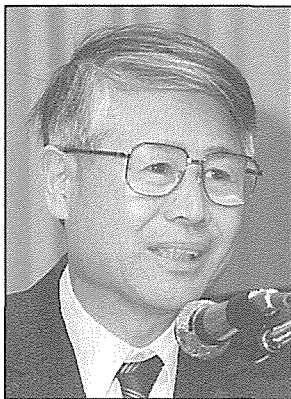
Jean-Marie Bourdairé

Mr. Bourdairé has been the Director of the IEA's Office of Long-Term Cooperation and Policy Analysis since November 1995.

Prior to joining the IEA, Mr. Bourdairé spent his entire career in TOTAL SA, a major French oil and gas company operating worldwide with interests in all energies. His last position there was as Director for Economic Studies (Corporate) after holding several other positions abroad and in Paris in Exploration, Operational Research and Economics.

Mr. Bourdairé was born in Paris, France on 25th July, 1946. He graduated from Ecole Nationale Supérieure des Mines de Paris in 1968. Mr. Bourdairé is the author of a book on "economic decision making" published in French (PUF-Que Sais-je-1985) as well as the author of many papers published or presented to international fora.

Jean-Marie Bourdairé is an associate professor with the French Petroleum Institute (ENSPM) in the Energy Management and Policy Programme and in ESSEC on Energy Policy and Strategy.



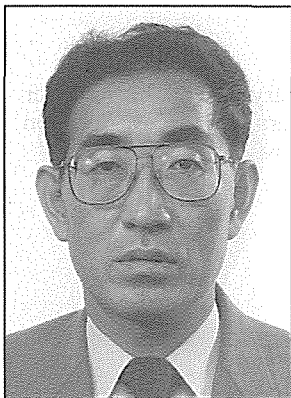
Iwane Fujii

After graduating from post-graduate school of Tokyo Institute of Technology in 1966, he became an assistant at the Institute and subsequently an associate professor at Meiji University.

Dr. Fujii served as a visiting professor at the Swedish Royal Institute of Technology and members of MITI committees relevant to efficient energy use and energy conservation.

Currently, he is Professor of Department of Mechanical Engineering, Faculty of Science and Technology at Meiji University.

He wrote a number of papers and books, including "Technologies for Solar Energy Utilization." Carrying out research into efficient energy use, he owns and operates an "energy-self-sufficient house," a model for lifestyle dedicated to energy conservation.



Kazuya Fujime

Born on June 16, 1940

1965 Graduated from Dept. of French Area Studies, Faculty of Liberal Arts, University of Tokyo.

1967 Graduated from Dept. of International Relations, Faculty of Liberal Arts, University of Tokyo.

Joined the Institute of Energy Economics, Japan(IEEJ).

1981-83 Research Fellow at MIT Energy Demand/Supply Analysis and Forecasting Group(IEEJ)

1991-93 Associate Director for Research(IEEJ)

1993 Director(IEEJ)

1995- Managing Director(IEEJ)

Major Publications :

The Oil Reports--Economic Journal

The Articles on New Industries--Economic Journal

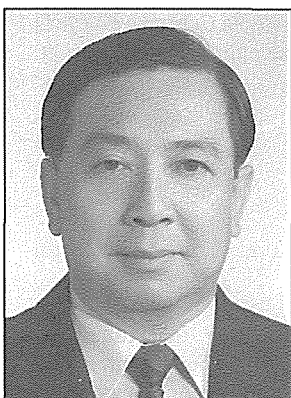
The Energy in the Twenty-first Century--the Institute of Energy Economics, Japan

The Energy and Society in the Future--Japan Society of Energy and Resources

International Economics

Energy Economics

Energy Policy & Forecasting



Kulthorn Silapabanleng

Born on June 21, 1943 in Thailand

Education : B. Eng.(Hons). 1965 and M. Sc.(Eng). University of London. 1967

D.L.C.. Imperial College of Science and Technology. London. 1967

Ph.D.(Combustion Engineering). University of London. 1971

Position : 1993- Director. Energy Research Institute Chulalongkorn Univ.

1982- Assoc. Professor of Mechanical Engineering. Chulalongkorn Univ.

1983-89 Deputy Director. Energy Research and Training Center. Chulalongkorn Univ.

1980-82 Deputy Dean for Research. Faculty of Engineering. Chulalongkorn Univ.

1976-78 Head of Department of Mechanical Engineering

Related research experience and publications :

• Thailand's National Energy Plan. The International Journal. 1981.

• Energy Conservation in The Kingdom of Thailand : Measures Taken and Planned.

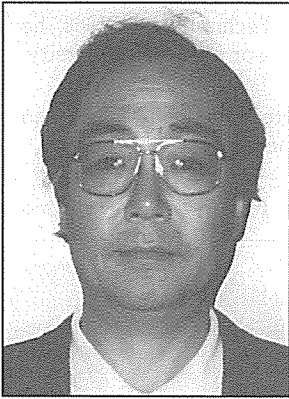
• Paper Presented at their East-West Center. Hawaii. APESC IV Workshop. May 1981.

• Transition from Oil to Alternative Fuels in Thailand. Paper Presented at the East-West Center. Hawaii. Apesc V Workshop. May 1982.

• K.Silapabanleng and others. Fluidised Bed Combusting of Mixed Fuel of Thai Oil Shale and Lignite. Alternative Energy Sources VII. Vol.5. Hemi Sphere Publishing Corp. 1985.

• K.Silapabanleng. High Efficiency Combustion Technology as a Future Energy Technology. Seminar of Efficient oil Combustion Technology. 10 March 1995. Bangkok.

SOCIAL DEBATE



Hiroyuki Torii

Date of Birth: July 17, 1942

Education:

1967 Graduated from University of Tokyo

1969 Master of Engineering, University of Tokyo

Career:

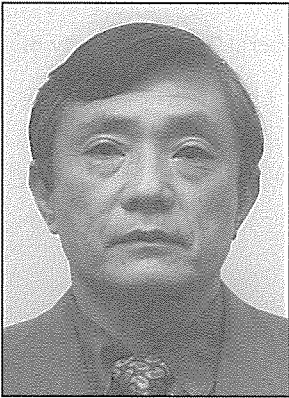
1969 Entered Nihon Keizai Shimbun

1969-1976 Scientific News Correspondent

1976-1982 Industrial News Correspondent

1982-1984 Scientific News Correspondent

1984- Senior Fellow, Nikkei Industry Research Institute (NIRI),
Editor-in-chief of Nikkei High Tech Report (Japanese edition)

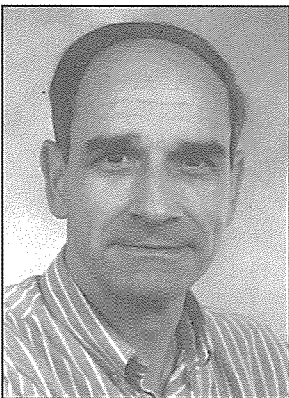


Jinzaburo Takagi

Born in Gunma in 1938

Graduated from Faculty of Science, University of Tokyo.

After having worked as a nuclear chemist in Nippon Atomic Industry Group, Institute for Nuclear Study of University of Tokyo and Tokyo Metropolitan University, joined foundation of Citizens' Nuclear Information Center. Since 1986 CNIC's Executive Director.



Jean-Pierre Chaussade

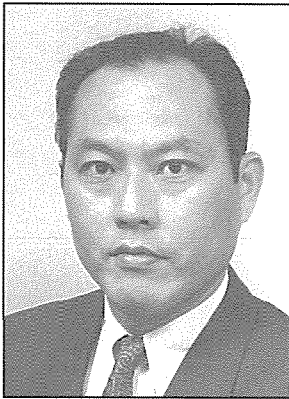
Mr. Chaussade, 51 years of age, is an engineer and graduate from the Ecole Centrale de Paris. Joining EDF in 1969 with the Equipment Staff Division, he worked on commissioning tests for several nuclear electric power stations, including Bugey-1 and Phenix in Marcoule, before becoming a member of the research team for Creys-Malville.

In 1976, he returned Phenix to manage maintenance and then operational control of the plant in the Thermal Power Production department.

In 1979, he was appointed to Creys-Malville to recruit and train operating staff for this prototype power station.

In 1986, he created an internal and external communication division for the department, for which he was responsible between 1986 and 1989. After the Chernobyl in 1986, he introduced the company's policy of accountability for France's nuclear power facility and was at the origins of the first guidelines program for nuclear power communication.

In 1989, EDF's General Management appointed Jean-Pierre Chaussade to the post of Technical Advisor in charge of corporate communication for the environment and nuclear power.



Yoichi Masuzoe

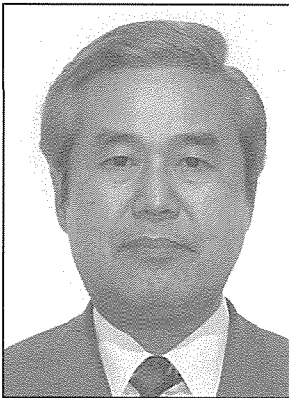
Yoichi Masuzoe was born on November 29th 1948 in Kitakyushu, Japan.

He read law politics at University of Tokyo. After receiving the degree of Bachelor of law, he was immediately appointed as research fellow of political science at his Alma Mater in 1972. Continued his research on history of international relations at Paris University and Geneva Graduate Institute of International Studies from 1973 to 1978, he returned to Japan to assume the post of associate professor of political science. In 1989, he left University Tokyo to explore new possibilities in the field of mass media and politics, while maintaining close relations with academia.

As one of the most well-known anchormen in Japan, he leads two weekly news programs for Fuji TV Network and Nihon TV Network. He published a number of books and articles about Japanese and international politics.

In 1991, he was selected by the Liberal Democratic Party(governmental party) as official candidate for governor of Hokkaido. He declined that offer. Subsequently, he has been repeatedly nominated as candidate for the Diet and the Upper House.

His hobbies are golf, skiing, judo, horse riding, etc.



Nobuhiro Naito

Date of birth : January 28, 1940

Place of birth : Kashiwazaki City, Niigata Prefecture, Japan

Career :

Apr. 1961 Joined the Kashiwazaki Chamber of Commerce & Industry

Apr. 1980 Division Manager, the Kashiwazaki Chamber of Commerce & Industry

Apr. 1984 Secretary General, the Kashiwazaki Chamber of Commerce & Industry

May 1991- President, the Kashiwazaki Chamber of Commerce & Industry

Mr. Naito holds many other posts, including Vice President of the Kashiwazaki Region Development Corp. ; Board Member of the Kashiwazaki Tourism Corp. ; Board Member of the Kashiwazaki Institute of Information Technology ; Member of Disaster Prevention Council of Kashiwazaki City.

He earlier led a team for studying "the power plants coexisting with local communities" in other countries.



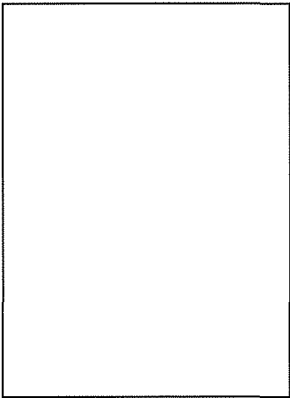
Miwako Ogiso

Secretary General of Council of the People of Fukui Prefecture against Nuclear Power.

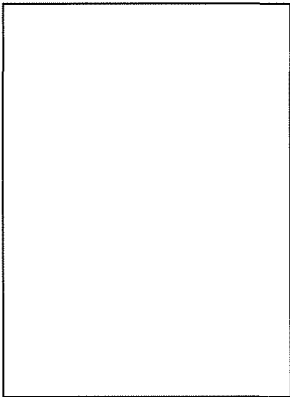
Born in 1936. Graduated from the Department of Politics and Economics of Waseda University. Completed the Master's Degree Program of Political thought at the same department. Worked as a reporter for the Fukui Shimbun newspaper. After leaving the paper, was involved in the establishment of the Council of the people of Fukui Prefecture against Nuclear Power in 1976.

Filed complaints at the prosecutor's office concerning an accident involving the release of radioactivity at the Unit of the Tsuruga Nuclear Power plant, remodeling work of steam generators by Kansai Electric Power Corporation without a permit, false reporting about the sodium fire accident at the Monju FBR, etc. against the respective operators. Is involved in a lawsuit calling for the interdiction of the work at Monju and the nullification of the permit for the establishment of Monju.

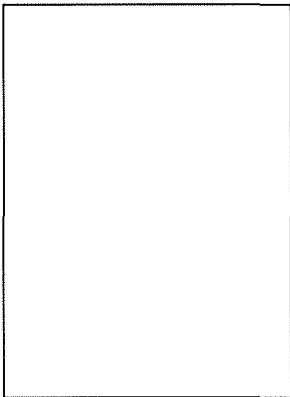
POLITICAL DEBATE



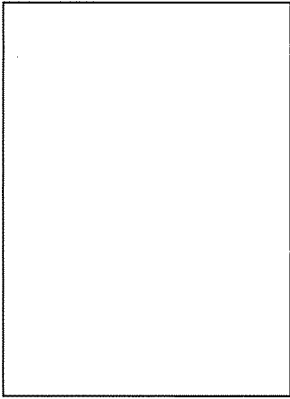
Taku Yamasaki



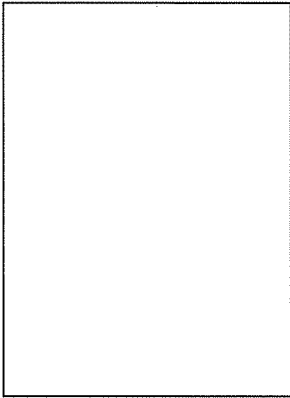
Shigeru Ito



Hiroshi Kikunami



Takeshi Noda



Yoshito Sengoku

DIALOGUE WITH THE PUBLIC



Kazuko Tamura

Date of birth : February 26, 1940

Place of birth : Tokyo

Education :

1962 Graduated from Ochanomizu Women's University (Bachelor of Education)

Career :

1962 Joined the Kyodo News Agency

Staff writer of City, Cultural and Science News

1989 Chief Editor, Science News Section and Editorial Writer (science, environment, life science)

1992 Senior Writer and Editorial Writer

1997 Deputy Chief Senior Writer and Editorial Writer

Other posts :

1993 Member, Council for Consulting Engineer

1995 Member, Panel on General Planning Council for Science and Technology



Kazuhisa Mori

Born on January 17, 1926 in Hiroshima Prefecture

Education : Graduated from the Kyoto Univ. Faculty of Science, Dept. of Physics in 1948

Occupational Record :

1948-56 Publisher Chuokoron-sha Inc.

1956-65 The Electric Power Development Co., Ltd.

1956- Japan Atomic Industrial Forum, Inc.

1963-65 Manager Programming Division, Tokyo Channel 12 TV Ltd.

1965- Director, Nuclear Safety Research Association

1978-96 Executive Managing Director, JAIF

1996- Vice Chairman, JAIF

Other Positions :

1975- Director, Marine Ecology Research Institute

1975- Director, Nuclear Materials Control Center

1976- Vice President, Japan Atomic Energy Relations Organization

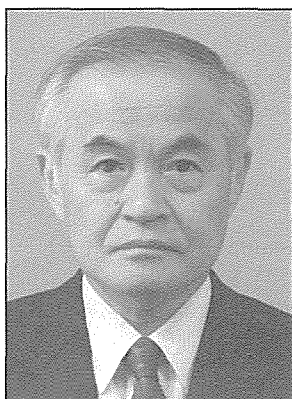
1984- Counselor, Power Reactor and Nuclear Fuel Development Corporation

1994- Councilor, University Alumni Association

Official Positions :

Special Member, Advisory Committee for Energy, Ministry of International Trade and Industry ; Special Committee Member, Atomic Energy Commission ; Special Committee Member, Nuclear Safety Commission, etc.

SESSION2



Hiroaki Fukami

Date and place of Birth : May 15, 1935, Tokyo

Present Post : Professor of Economics, Keio University

Education :

Mar.1958 Graduated from the Department of Economics, Keio University

Mar.1960 Finished the Master Course of Economics, Keio University

Mar.1963 Finished the Ph.D.Course of Economics, Keio University

Apr. 1968 to Mar. 1969

Studied at London School of Economics and Political Science

Occupation :

Apr. 1962 Assistant, Department of Economics, Keio University

Apr. 1966 Lecturer, Department of Economics, Keio University

Apr. 1967 Associate Professor, Department of Economics, Keio University

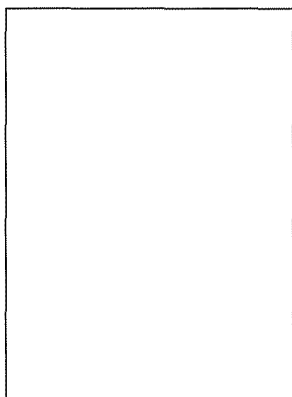
Apr. 1975 Professor, Department of Economics, Keio University

Oct. 1983 to Sep. 1987

Director, International Center, Keio University, (Concurrent Post)

Major Subjects :

International Economics, Economics of Resources, Energy and Environment



George Marsh

Qualifications :

Ph.D., Mechanisms of Stress Corrosion Cracking in Steels, University of Newcastle-upon-Tyne, and others.

Present Project Director for :

UK Department of the Environment "Evaluation of the Feasibility, Potential Savings and Implementation Costs for using Market Based Instruments for attaining future SO₂ Air Quality Standards"; CEC DGXVII Project "Developing a Future Strategy for Energy Technology Research, Development, Demonstration and Implementation"

Career History :

1990- Manager, Strategic Studies Department, ETSU. Personal responsibilities include the management of the UK Department of Trade and Industry's Strategic Studies Program.

1983-90 Leader, Corrosion Technology Group, Materials Development Division, Harwell

1978-83 Leader, Aqueous Corrosion Section, Corrosion Technology Group, MDD, Harwell

Professional activity :

1994- UK representative to the IEA Working Group on Technology Assessment and Methodologies for R&D Priority Setting and Evaluation, and others.

Recent Publications :

"Comparison of Energy Technologies and the Use of Full Life-Cycle Analysis," "Methodologies for Assessing the Formulation of an EU Energy R&D Strategy," "Global Warming and Power Generation," and others.



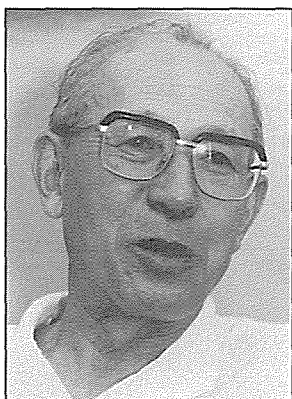
Michael Folger

Mr. Folger was appointed Managing Director of UK Nirex Ltd in September 1991. The company, owned by the principal members of the UK nuclear industry, is responsible for designing, constructing and operating a national disposal facility for low and intermediate level radioactive waste. Michael folger was appointed a member of the Radioactive Waste Management Advisory committee (RWMAC) in 1991.

Mr. Folger was educated at Cambridge University where after initially reading Natural Sciences, he graduated in Economics. As a Harkness Fellow of the Commonwealth Fund of New York, he later studied at the Sloan School of Management, Massachusetts Institute of Technology and qualified as Master of Management Science.

His career began at HM Treasury where he served from 1971 to 1985. From 1981 to 1983 he was seconded to B.A.T Industries plc.

In 1985 Mr. Folger joined the London office of Dean Witter Reynolds Inc. which he left, as Senior Vice President, in 1991 for the Nirex appointment.



Born in 1925 in Shanghai, China

Education :

1949 Graduated from Faculty of Science, University of Tokyo

Career :

1949-56 Governmental Industrial Research Institute, Tokyo, Ministry of International Trade and Industry

-83 Deputy Senior Researcher, Division of Reactor Chemistry, Tokai Research Establishment, Japan Atomic Energy Research Institute (JAERI)

1972-85 Member, the 4th Group, Science Research Council of Japan ; Member, Special Committee for Atomic Issues

Former Professor, Faculty of Commercial Sciences, Chuo University (Natural Sciences)

Tokunosuke Nakajima



Yoshihiko Sumi

Date of Birth: November 15, 1930

Academic Career:

1953 Graduated from Electrical Engineering, Kyoto University

Professional Career:

1953 Joined the Kansai Electric Power Co., Inc.

1971 Director of Kujo Sales office

1972 Resident Engineer in Indonesia as a member of Newjec Inc.

1974 Assistant General Manager, System Engineering Department

1977 General Manager, System Engineering Department

1979 General Manager, Central Office of High Voltage Transmission Projects Construction

1981 General Manager, Hokuriku District Office

1983 General Manager, Fukui Nuclear Power District Office

1985 Elected to the Member of the Board of Directors

General Manager, Fukui Nuclear Power District Office

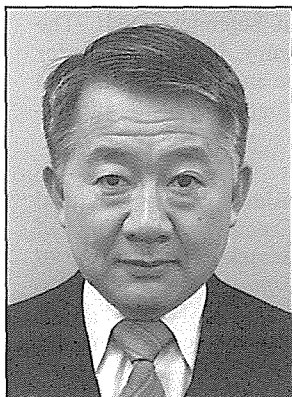
1986 Board Director, Nuclear Operations

1987 Board Director, Nuclear Operations and Nuclear Projects

1988 Managing Director

1991 Senior Managing Director

1993 Director and Executive Vice-President



Makoto Takahashi

Born on November 24, 1947

May 1970 Graduated from Yokohama National Univ. BS in electrical engineering

Jun. 1970 Joined Science and Technology Agency(STA), working in the areas of monitoring program, waste management, public information

Nov. 1974 Seconded to OECD/NEA

Nov. 1977 Returned to STA, working in the areas of waste management, R&D coordination, natural resources management, etc.

May 1984 Seconded to Ministry of Foreign Affairs, Embassy of Japan in Austria(contact with IAEA)

Apr. 1987 Seconded to Institute of Physical and Chemical Research, Deputy Director of Frontier Research Program

Apr. 1989 Director of Administration. National Institute of Disaster Prevention and Earth Sciences of STA

Jul. 1990 Seconded to Japan International Cooperation Agency, Science Advisor to Indonesian Institute of Science

Jun. 1992 Director of Safeguards, NSB, STA

Jun. 1993 Seconded to Japan Atomic Energy Research Institute(JAERI), Deputy Director, Nuclear Safety Research Center

Apr. 1995- Deputy Director for Safety and Regulation, NEA



Andrei Zobov

Education : Moscow State Institute of International Relations ; History of International Relations. 1949-1954

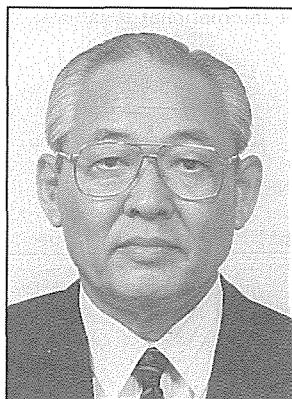
Professional experience :

Second European Dept., Foreign Ministry, Moscow, 1954-56, 1958-60 ;
USSR Embassy in London, 1956-58, 1960-62 ;
Assistant to Deputy Foreign Minister, Moscow, 1962-63 ;
UN Secretariat, New-York, 1964-69 ;
International Organizations Dept., Foreign Ministry, Moscow, 1969-76, 1981-86 ;
USSR Permanent Mission to IAEA Vienna, 1976-81 ; 1986-91 ;
Director, Nuclear Non-Proliferation Project, Carnegie Endowment for Int'l Peace, Carnegie Moscow Center, 1994--.

Professional activities and Membership :

Co-Chairman, CIS-USA Nuclear Forum, Carnegie Endowment for International Peace
Chairman, Russian Chapter, Institute of Nuclear Materials Management
Editor, "Nuclear Proliferation" Magazine
Russian Nuclear Society, Non-proliferation Group
Association for Non-Proliferation, Moscow
Arms Control and Non-Proliferation Division, Institute of Nuclear Materials Management
Int'l Advisory Group, "Nuclear Successor States of the Soviet Union, Nuclear Weapon & Sensitive Export Status Report"

SESSION3



Kunihiro Uematsu

Date of birth: May 4, 1931

Place of birth: Kagawa, Japan

Careers :

1954 Graduated from Kyoto Univ.

1956 Master of Science from Kyoto Univ.

1961 Doctor of Philosophy from M.I.T.

1961 Lecturer of Kyoto Univ.

1964 Joined Atomic Fuel Corporation.

(Reorganized to PNC in 1967)

1968 Senior Research Engineer.

FBR Project, PNC (Power Reactor and Nuclear Fuel Development Corporation)

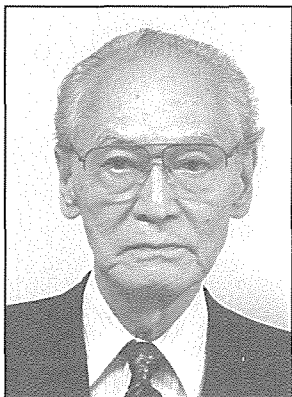
1982 Director of Fuels Development Division, PNC

1983 Executive Director, PNC

1988 Director General, OECD/NEA

1995 Technical Advisor, PNC

1996 Executive Vice President, PNC



Hiroshi Murata

Date of Birth : March 10, 1915

Education :

1937 Graduated from Mechanical Course, Ryojun (Port Arthur) Institute of Technology

Career :

1958 First Secretary, Embassy of Japan in U. K.

1963 Director General, Resources Bureau, Science and Technology Agency (STA)

1964 Director General, Planning Bureau, STA

1964 Director General, Atomic Energy Bureau, STA

1967 Executive Director, Power Reactor and Nuclear Fuel Development Corporation (PNC)

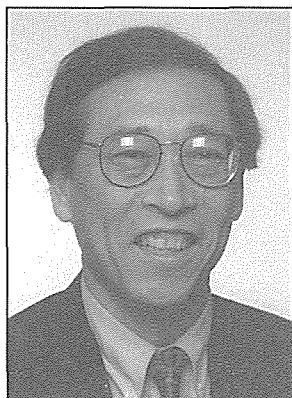
1978 President, Japan Atomic Energy Research Institute (JAERI)

1981 President, Nuclear Safety Research Association

1983 President, Nuclear Safety Technology Center

1987 President, Japan Atomic Energy Relations Organization

Other Major Positions : Vice Chairman, Japan Atomic Industrial Forum Inc. (JAIF) ; Chairman of the Steering Committee, International Nuclear Cooperation Center, JAIF ; Special Adviser, JAERI etc.



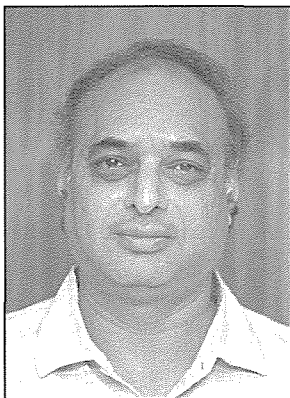
Edward Fei

Edward T. Fei is Deputy Director for Policy of the International Policy and Analysis Division of the Department of Energy. He first joined the Department as the head of the Export Control Branch in 1988.

The focus of his activities is on regional arms control and nonproliferation, international cooperative monitoring, and the possibilities in Asia for nuclear fuel cycle cooperation and conflict. He has testified before Congress on the international civil uses of plutonium and spoken in Japan on plutonium disposition. In 1996, he made six separate trips to Asia including Japan, China and Korea.

Prior to joining the Department of Energy, Mr. Fei worked on nuclear nonproliferation and conventional arms transfer issues for 10 years at the State Department in the Office of Nuclear Export Control, and the U.S. Arms Control and Disarmament Agency in the International Nuclear Affairs Division.

Mr. Fei is a 1967 graduate of Swarthmore College, and did graduate work at the University of Michigan in Political Science and International Relations. He has taught international relations at Colgate University and California State University at Chico.



Yeleswarapu Sivarama Prasad

Date & Place of birth: April 29, 1938 (Pedaprolu-INDIA)

History and degree of education with dates:

Andhra University	1953-56	General Engineering, Chemical Engineering
Andhra University	1956-57	Chemical Engineering
BARC Training School	1957-58	Nuclear Engineering

Business Career:

Joined Department of Atomic Energy in 1957.

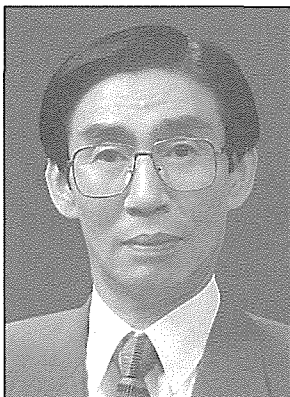
Was deputed to Canada for a period of three years under the Colombo Plan where actively associated with nuclear power development in Canada and participated in commissioning of Douglas Point generating station.

After return from Canada, coordinated the commissioning of Rajasthan Atomic Power Station Unit- I and as Commissioning Superintendent was responsible for commissioning later of the Unit-II of Rajasthan Atomic Power Station.

As Officer In-charge (O&M) at Narora organised the commissioning activities during 1984-85. Held the charge of Chief Project Engineer, Kakrapar Atomic Power Project (KAPP) from 1985 to mid 1989. Was responsible for the construction of KAPP.

Took over as Project Director, Narora Atomic Power Project (NAPP) in 1989 and held the charge till July 1992.

Took over as Director (Operations) in August 1992 and then as Adviser (Operations) in October 1992 and Executive Director (operators) in July 1993 and is responsible for the safe and efficient operation of all the Indian nuclear power reactors. He is a member and fellow of many professional organisations and a Governor of the WANO-Tokyo Centre. He has been presently designated as Managing Director, Nuclear Power Corporation of India Ltd. He is also Chairman of Indian Atomic Industrial Forum.



Chang-Saeng Shim

Date of Birth : December 17, 1941

Title : Vice President, International & North Korea Project Div.,
Korea Electric Power Corporation(KEPCO)

Education :

Feb. 1964 Graduated from Mechanical Engineering of Seoul National University.

1995 Completion of Advanced Information Management Course at Korea Advance Institute of Science & Technology

Experience :

May 1995- Present Vice President, Int'l & North Korea Project Div.

Apr. 1993- May 1995 Vice President, Technology Development Div.

Aug. 1990- Apr. 1993 General Manager, Nuclear Safety Office

Feb. 1988- Aug. 1990 General Manager, Project Control System Development Office

Feb. 1986- Feb. 1988 General Manager, Nuclear Power Plant Construction Dept.

Feb. 1985 Construction Site Manager of Kori #3,4 units

Apr. 1979 Project Manager, Constructio of Kori #3,4 units

Jan. 1974 Manager of Quality Assurance Dept., Kori Nuclear Power Plant

May 1970 Section Manager, Construction Dept. of Conventional Power Plants

Feb. 1964 Employed by Korea Electric Power Company



Atsuyuki Suzuki

Born in Tokyo on October 31, 1942.

Career:

1985- Professor, Dept. of Nuclear Engineering, University of Tokyo

1977 Associate Professor, Ditto,

1975 Research Associate Ditto,

1974 Research Staff, The International Institute for Applied Systems Analysis, Laxenburg, Austria

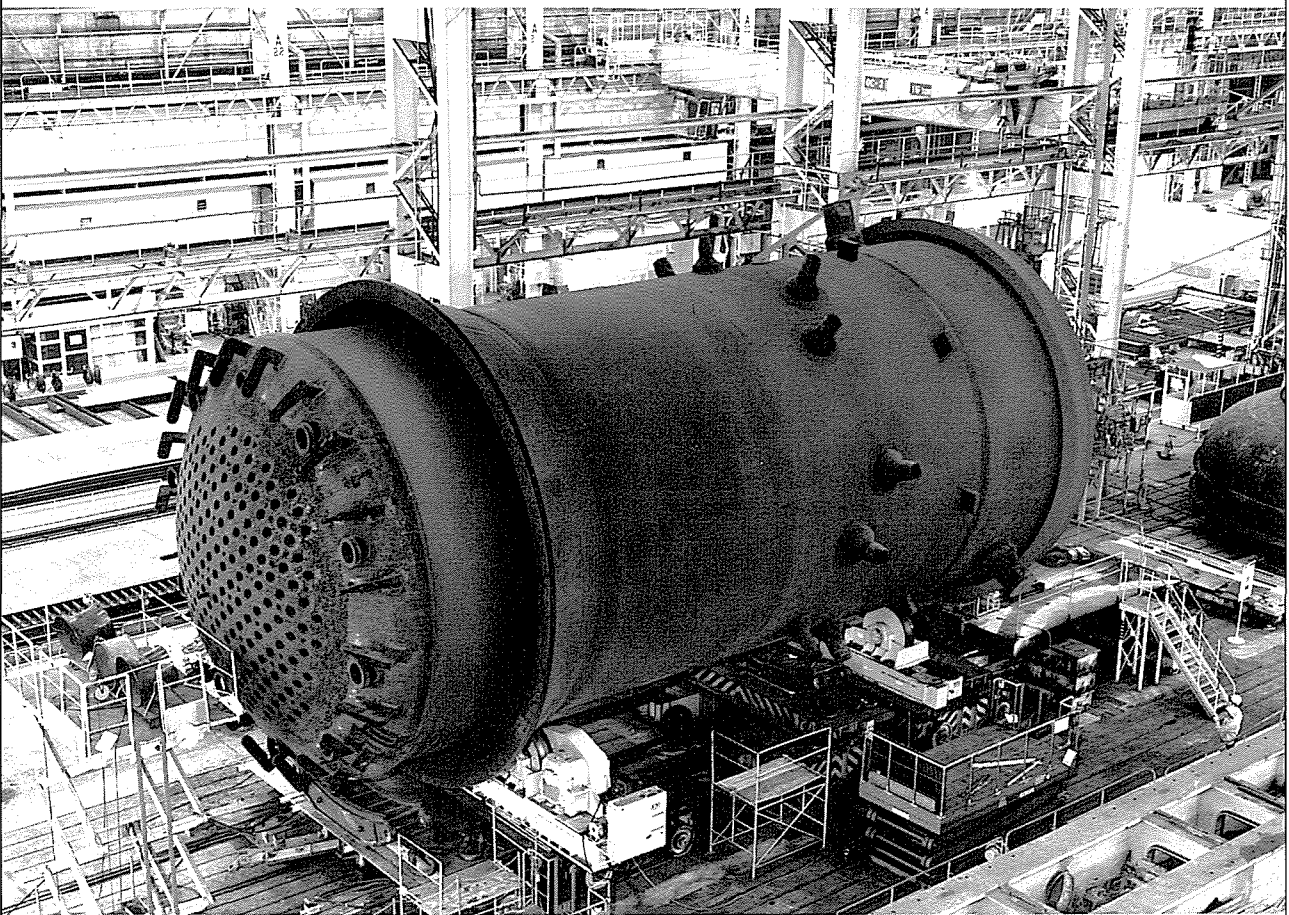
1971 Research Associate, Nuclear Engineering Research Laboratory, the University of Tokyo, Ibaraki.

Educational Background:

Ph.D in Nuclear Engineering (1971); MS in Nuclear Engineering (1968); BS in Nuclear Engineering (1966). All from the University of Tokyo.

He is also Members of the Special Committee, Atomic Energy Commission, the Special Committee, Nuclear Safety Commission, and the Special Committee, Advisory Council on Energy, Agency of Natural Resources and Energy, MITI.

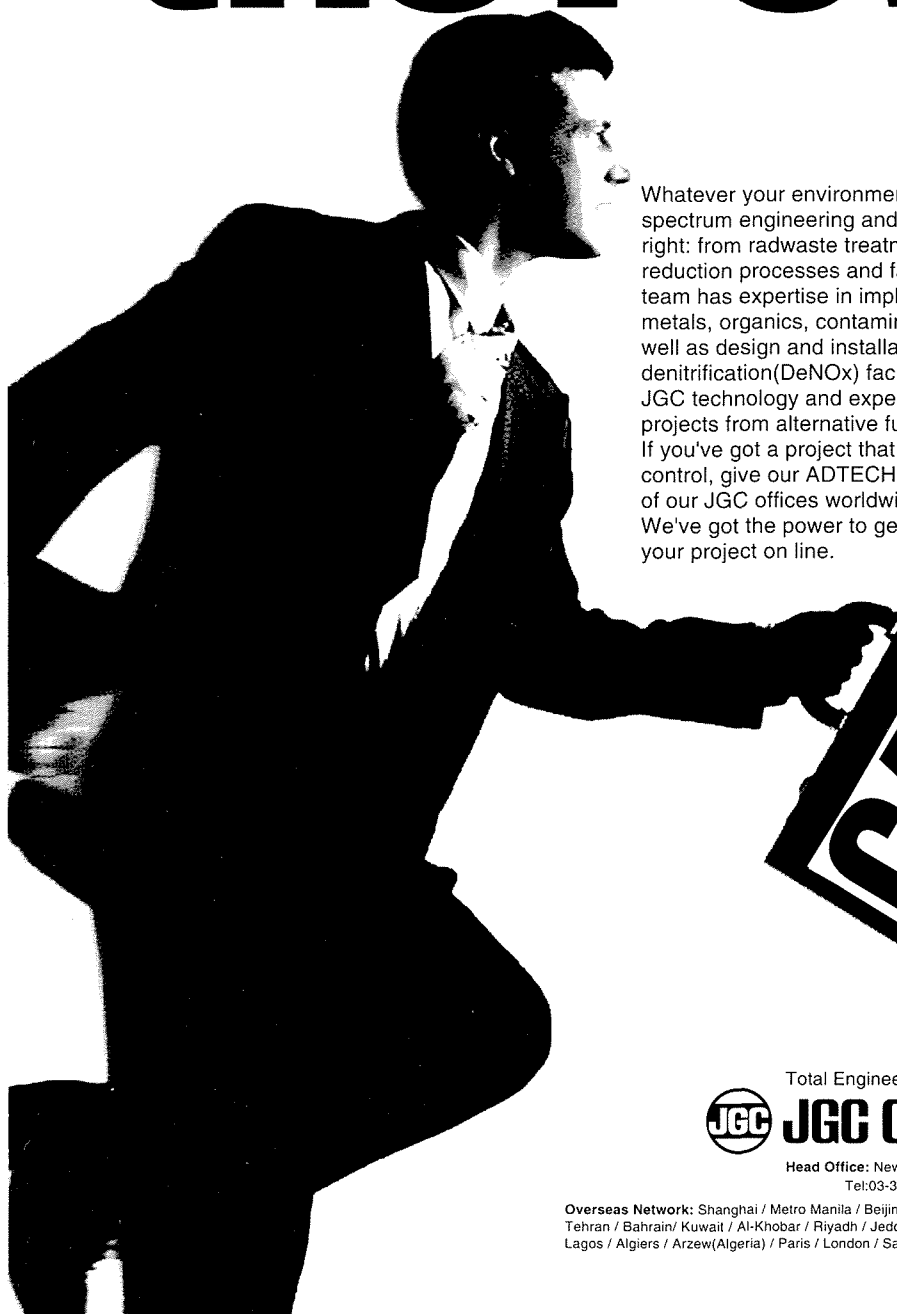
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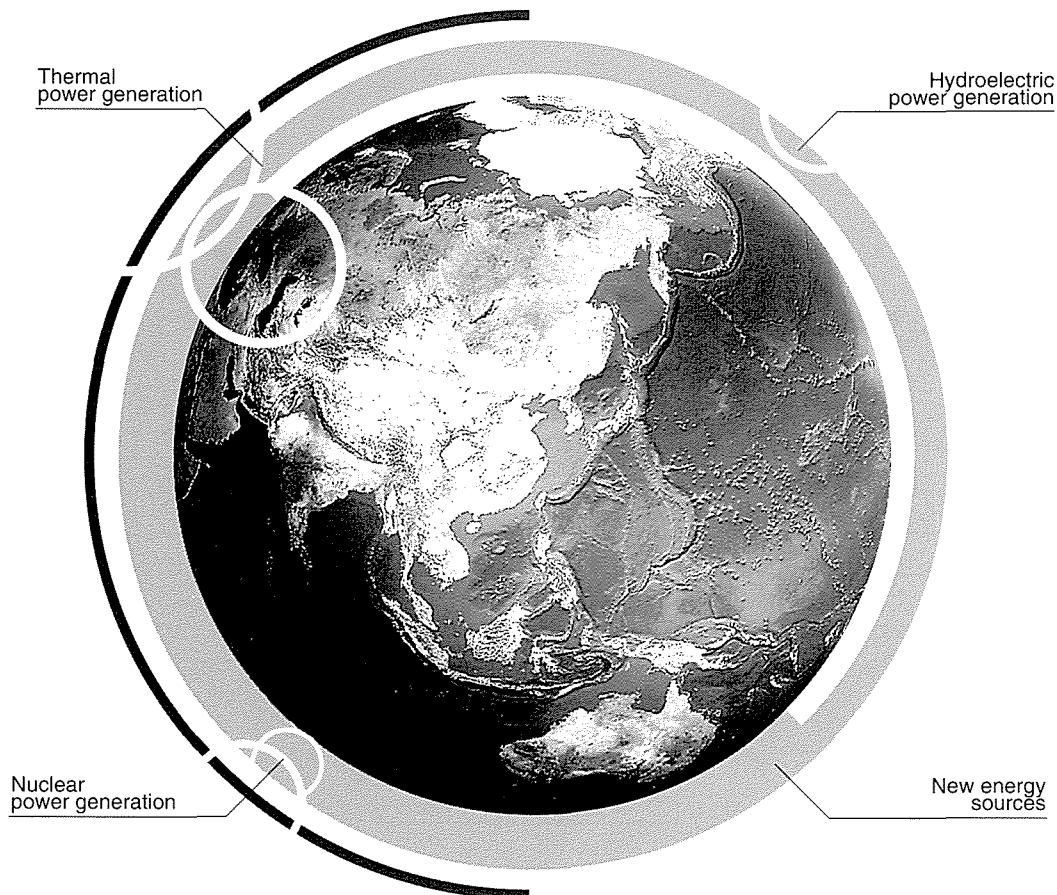


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