

FNCA Newsletter

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The Fourth Meeting of the Forum for Nuclear Cooperation in Asia (FNCA)



① Shuriyo Castle ② Group picture of Delegates of FNCA Countries ③ Mr. Toshimitsu Motegi, Minister of State for Science and Technology Policy ④ Beautiful Beach and Ocean in Cobalt Blue ⑤ Meeting in Summit Hall

Highlights of the 4th FNCA Meeting

The Ministerial Level Meeting (MM) of the 4th Forum for Nuclear Cooperation in Asia (FNCA) was held on December 2 and 3 in 2003 in Okinawa Prefecture, Japan, with the basic theme “Nuclear Energy for Future of Mankind and the Globe”. This Meeting was sponsored by the Atomic Energy Commission (AEC) of Japan, with support of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and Okinawa Prefecture. The participants were Ministers and Senior Officials, responsible for the peaceful nuclear research, development and utilization from nine Asian countries, i.e. Australia, the People’s Republic of China, Indonesia, Japan, the Republic of Korea, Malaysia, the Philippines, Thailand and Viet Nam.

- At the Round Table Discussion, two topics, namely: “Enhancement of Socio-Economic Impact of Radiation and Radioisotope Application” and “Sustainable Development and Nuclear Energy” were discussed.

Tuesday, December 2 Senior Officials Meeting (SOM)

Opening

- Item 1: Report on the Fourth FNCA Coordinators Meeting (CM) and Progress of FNCA Activities
Item 2: Management and Operation of FNCA Activities
Item 3: Special Session (High Level Discussion on Human Resources Development (HRD) Strategy for Nuclear Science, Technology and Applications)
Item 4: Preliminary Talks on Round Table Discussion of Ministerial Level Meeting (MM)
Item 5: Adoption of Summary Report

Welcome Reception and Dinner

Wednesday, December 3 Ministerial Level Meeting (MM)

Opening Session

- Session 1: Round Table Discussion
Topic 1: Enhancement of Socio-Economic Impact of Radiation and Radioisotope Application
Topic 2: Sustainable Development and Nuclear Energy
Session 2: Progress of FNCA Activities and the Report from the SOM
Session 3: Country Report Presentation

Wrap-up Session

Thursday, December 4 Technical Visits

Seawater Desalination / Fruit Fly Eradication Facility

(1) Conclusions on the first topic were as follows:

- a. Applications of radiation, radioisotopes and nuclear technology, in the fields of health, agriculture, industry and environmental protection, are important for sustainable development.
- b. The linkage between research and development institutions and end users should be enhanced.
- c. To improve the linkage, the FNCA countries are encouraged to have open seminars in conjunction with project workshops and meetings.
- d. For the effective application of radiation and nuclear technology, information exchange with the public is vitally important.

(2) For the second topic of the Round Table Discussion, conclusions were as follows:

- a. It is foreseen that demand for energy and electricity will increase in the FNCA countries due to economic and population growth. In order to meet the increasing demand for energy, nuclear energy is a feasible option in most countries of the FNCA.
- b. Nuclear energy should not be excluded from Clean Development Mechanism (CDM) in the second commitment period starting from 2013.
- c. The proposal to initiate a new panel on "Role of Nuclear Energy for Sustainable Development in Asia" was endorsed, and the report should be submitted promptly.
- The progress of FNCA activities and the summary of the Senior Officials Meeting (SOM) that was held the previous day were reported. The delegates expressed their appreciation for the tangible progress of FNCA activities, and accepted these reports.
- In Session 3 of the MM, the country reports on "Nuclear Research and Development Policy of the Country and FNCA Activities" were presented.
- The representative of Viet Nam proposed that the Fifth FNCA Meeting be held in 2004 in Viet Nam and it was endorsed.

Opening Session

Opening Address by Mr. Toshimitsu Motegi, Minister of State for Science and Technology Policy

Nuclear energy is important to the progress of medicine, to the development of farming and other industries, and for stable supplies of the electrical power needed for future economic development.

The use of nuclear energy technologies

In Okinawa, in dealing with the damage caused by melon flies on mangoes, goyas (bitter melons), and other melon crops, we have been successful in eradicating melon flies by irradiating pupae with gamma rays to render them sterile. This has made it possible for people throughout Japan to enjoy Okinawa's fruits.

Use of nuclear energy and sustainable development

In October 2003, the Cabinet of Japan approved "The Basic Plan for Energy Supply and Demand". As Japan is not blessed with oil, coal, or other domestic energy resources, the above Plan identifies nuclear power as a key power source taking the safety as basic prerequisite. We intend to establish a nuclear fuel cycle for efficient use of nuclear resources.

There are many approaches for sustainable development depending on the nation's indigenous conditions and energy situation. I would like to see this meeting serve as a forum in which we may exchange views concerning the role that nuclear power has to play in the energy supply and issues related to its use.

Okinawa is being developed as a center of international exchange in the Asian and Pacific regions, and plans to call for an Institute of Science and Technology. I would like to express my sincerest wishes that the cooperative efforts which come out of this meeting will help contribute to the development of nuclear energy and bring prosperity to all the participating nations.

Welcome Remarks by Mr. Keiichi Inamine, Governor of Okinawa Prefecture (read by Mr. Hirotaka Makino, Vice Governor)



Mr.H.Makino

We had G-8 Summit Kyushu - Okinawa Conference in Year 2000. Okinawa Prefecture, suffering from the outbreak of pestilent fruit flies that live on gourds, water melons, other fruits and vegetables, drew up a plan to eradicate the fruit flies by

using the radiation method of Sterile Insect Technique (SIT). With this SIT, we were able to eradicate all the fruit flies from Okinawa by 1993, to ship subtropical special products including goya (bitter melon) known as secret of longevity of Okinawa people, to the mainland market of Japan.

Session 1: Round Table Discussion

Topic 1: Enhancement of Socio-Economic Impact of Nuclear Technology Application

Moderator by H.E. Dr. Estrella F. Alabastro, Secretary of Department of Science and Technology (DOST), The Philippines, and Lead-off Speech by H.E. Dato Seri Law Hieng Ding, Minister for Science, Technology and the Environment, Malaysia

Lead-off Speech by H.E. Dato Seri Law Hieng Ding

1. The utilization of nuclear technology in various fields in Malaysia has contributed to the significant impact on our socio-economics development. As a policy objective, we

should maximize the utilization and advancement of nuclear science and technology as a tool for sustaining economic development, the improvement of quality of life and well-being of the country. Nuclear technology alone may not be sufficient to achieve that objective, so it should be integrated with other related and conventional technologies.

2. The nuclear technologies must be relevant to the needs of the end users and provide high values to them. Therefore nuclear knowledge which is normally acquired and developed by the nuclear research institution should be transformed into products, processes, services or solutions that add value across every industry for maximum socio-economic benefit. On top of that we have to ensure the utilization of nuclear technology is well accepted and accords emphasis towards approaches that are in conformity with sustainable developmental goals including alignment with societal norms and ethics.
3. Dissemination of technology is also vital in creating the infrastructure and environment within which the needs of the technology and end-users can work together for mutual benefit. For maximum effectiveness, the private sector and end-users have to be encouraged to look into the long term benefit through direct participation in the technology project, whilst the research institution has to reorient its activities in line with the end-users needs. The participation of end-users from the very beginning in the project is very essential that will also provide ownership to them for the later utilization of the technology.
4. For the application of nuclear technology to be effective, there must be in place a comprehensive technology transfer program to the end-users. This is not only to ensure the protection of the intellectual property by the research organization but it is also to ensure that the end-users will have the back up support and continuous technical assistance in the implementation of the technology transfer program.
5. To encourage the development and establishment of the industry especially the small and medium scale industries utilizing nuclear technology in the country, initiatives such as incubator and techno-entrepreneurship programs should be established at the nuclear research institutions so that specific nuclear technologies could be further developed from the laboratory scale to the semi commercial scale before they are finally commercialized.

Topic 2: Sustainable Development and Nuclear Energy

Moderator and Lead-off Speech by Mr. Tetsuya Endo, Vice Chairman, Atomic Energy Commission of Japan

Lead-off Speech by Mr. Tetsuya Endo

Sustainable development requires energy. When energy



Mr.T.Endo

simultaneously in practice.

is used, there are effects on the environment. Those effects vary with the type of energy selected, but, in any case, it is easier to preach the three E's - Economic growth, Energy security and Environmental protection - than it is to achieve them

Economic Growth in Asia

Many Asian countries have good economic fundamentals and will continue to enjoy economic growth. Populations are increasing, too. Both factors - growth and population - make higher energy demand inevitable in Asia. Air pollution in large cities, and the need for adequate supplies of food and water, may all be problems in the future.

Energy Issues and Nuclear Energy

Yet as energy demand grows unavoidably, most Asian countries are highly dependent on oil from the Middle East. Most experts agree that, in the medium term, the oil supply situation will become tight.

Nuclear generation is essential to energy security for Japan. Fifty-two nuclear reactors currently provide nearly 35% of Japan's total generated electricity.

In Korea, 18 reactors provide almost 40%. In China, several more NPPs have gone into service since last year, and there are now eight in operation. Viet Nam, too, is working toward introduction of nuclear generation, and is expected to proceed to a Feasibility Study soon. I understand that construction of nuclear power stations is under consideration in Indonesia as well.

At the same time, of course, further efforts should be made toward developing renewable energies, including wind power, solar power and biomass. These should prove particularly useful in the role of smaller, dispersed power sources for remote areas.

Environmental Issues and Nuclear Energy

The Kyoto Protocol obliges industrially advanced nations to reduce greenhouse gases - the primary cause of global warming - by an average 5.2% from their 1990 levels during the First Commitment Period, 2008 through 2012. At the COP6, nuclear energy was regrettably excluded from Clean Development Mechanisms - CDM's - under the Protocol. Depending on what CDM-project-recipient nations want to do, it may be important again to try to include nuclear energy in the Second Commitment Period, beginning in 2013.

At the FNCA, projects related to those environmental problems are under way. One seeks to develop radio-activation

analysis technology for suspended dust particles in the air. This will allow better analysis of air pollution and help in the development of environmental policy. Another project involves improving crop varieties, including soybeans, through mutation breeding by radiation. Still another aims to increase harvests with new, environmentally friendly bio-fertilizers.

Conditions for Peaceful Nuclear Use

The use of nuclear energy is accompanied by challenges related to safety, nuclear proliferation, treatment and disposal of radioactive waste, and public acceptance.

In the relationship between sustainable development and nuclear energy, different countries may have somewhat different interpretations, depending on their own circumstances. This is only natural, and looking from different angles can yield varied approaches. In that context, I hope my comments might serve as a reference in the roundtable discussion.

Session 2: Progress of FNCA Activities and the Report from the Senior Officials Meeting (SOM)

Mr. Soichi Nagamatsu, Deputy Director General for Science and Technology Policy of the Cabinet Office of Japan summarized the progress of FNCA activities and the SOM that was held the previous day. The SOM Summary Report was duly adopted at the Ministerial Level Meeting.

Following the suggestion at the Third FNCA Meeting in Seoul, high level discussion on the ‘Human Resources Development Strategy’ took place at the SOM, and a summary was reported by Dr. Sueo Machi, FNCA Coordinator of Japan.

Session 3: Country Report Presentation



Viet Nam

H.E. Mr. Hoang Van
Huay, Vice Minister,
Ministry of Science and
Technology (MOST)

In September 2003, the Vietnam Atomic Energy Commission (VAEC) and the International Atomic Energy Agency (IAEA) signed the Country Program Framework for Technical Co-operation for various application of nuclear science and technology for the period 2003-2008. Reports on Pre-Feasibility Study (Pre-FS) on the first nuclear power plant (NPP)'s construction in Viet Nam and study and elucidation of seven aspects in relation to the nuclear power development in Viet Nam are going to be completed. The study results concluded that to meet energy demand, the first NPP should be put into commercial operation in Viet Nam by 2017-2020. The

National Assembly Standing Committee approved to formulate Draft Atomic Energy Law of Viet Nam. A Steering Committee was established. H.E. Minister of MOST is appointed as the Chairman of the Committee.

Utilization of Research Reactor

< ^{99m}Tc Generator Production >

Poly Zirconium Compound (PZC), an adsorbent of Mo-99, was successfully synthesized also in Viet Nam.

< Application of Neutron Activation Analysis (NAA) >

- The air pollution study

During 2002, the airborne particulate samples were collected in two typical sites of industrial (Ho Chi Minh City) and rural (Dateh) regions in the south of Viet Nam. The concentration of trace elements in the samples has been determined by the k0-NAA procedure developed in Da Lat Nuclear Research Institute (NRI).

Radioisotopes and Radiation for Medical Use

The Government of Viet Nam approved the establishment of a Medical Hi-tech Center with the provision of the first PET-Cyclotron System in the country. A national project on the Establishment of Cyclotron Center is being formulated with the participation of the VAEC, the Tran Hung Dao Hospital, Institute of Physics, Ha Noi University of Technology, and Ha Noi Science University.

Public Information of Nuclear Energy

The 4th exhibition on peaceful uses of nuclear power was held in Ho Chi Minh City in April 2003 with supports of Japan. October 2003, the VAEC participated in the Viet Nam Tech Mart 2003 in Ha Noi. In March 2003, a delegation of Steering Committee for study on Nuclear Power Development in Viet Nam visited the nuclear installations in Korea and Japan. In September 2003, a delegation of the Communist Party of Viet Nam (CPV) visited Japan to study nuclear power development of Japan.

During the 2003 FNCA Public Information Project Leaders Meeting in November 2003, two seminars on “Strategy on Public Information for Nuclear Power Development” in Ha Noi and “Application of Radiation Technology in Industry” in Ho Chi Minh City were held. The mass media, such as Viet Nam Television (VTV), Voice of Viet Nam (VOV) and newspapers reported of those events.

Radioactive Waste Management

In the Institute for Technology of Radioactive and Rare Elements (ITRRE), 130 tons of LLRW, including waste from monazite processing are being treated. There are 739 sources distributed in 17 among 39 provinces (210 sources in use, and the other are spent sources).

In July 2003, the FNCA Task Group of Technologically

Enhanced Naturally Occurring Radioactive Materials (TENORM) had completed its mission in Viet Nam, the discussion showed that some NORM/TENORM industries require improvement of radiation protection.

Human Resource Development

The government assigned VAEC and the Institute of Energy (IE) to conduct studies on preparation of manpower for atomic energy development. At present, VAEC has established cooperation with four universities (Ha Noi University of Technology, Ha Noi University of Science, Ho Chi Minh City University of Science, Da Lat University). Through the international cooperation channels (IAEA, RCA, FNCA, bilateral), every year, about 150-200 people have been trained abroad.

Nuclear Safety Culture

Safety culture were lectured in 10 training courses on radiation safety with 450 participants in total. The FNCA Workshop on Nuclear Safety Culture was held in Da Lat, in January 2003. The Workshop and Peer-Review were very useful for fostering and strengthening safety culture for Viet Nam. In 2003, two Workshops on Nuclear Safety Culture were organized in Ha Noi under the framework of MOST's project on elucidation of seven aspects related to the nuclear power development in Viet Nam.

Application of Electron Accelerator

Market survey on product types and quantities, processed by gamma irradiator and by Electron Beam (EB) machine in the fields of industry and health care, has been conducted by the Research and Development Center for Radiation Technology (VINAGAMMA). VAEC is considering installation of EB machine at the VINAGAMMA.



Thailand

Mr. Pathorn Yamkate,
Secretary General,
Office of Atoms for
Peace (OAP)

Enhancement of Socio-Economic Impact of Radiation and Isotope Application and Sustainable Development and Nuclear Energy in Thailand

The major recommendation given to Thailand from the IAEA was to urgently establish proper national infrastructure for radiation protection. In October 2002, the Office of Atomic Energy for Peace (OAEP) was renamed the Office of Atoms for Peace (OAP) and remains as a government bureaucrat. The promotional research and development functions will be reorganized to the Thailand Institute of Nuclear Technology

(TINT).

One of the major projects of OAP is the new Ongkharak Nuclear Research Center (ONRC) Establishment Project, comprising of three major facilities, namely 10 MW TRIGA research reactor, radioisotope and radiopharmaceutical production facility, and centralized radioactive waste processing and storage facility. The contract was awarded to General Atomics (GA) of USA. The Construction Permit (CP) was granted on September 29.

Socio-Economic Impact of Radiation and Radioisotopes Application

Agriculture: Mutation Breeding

New mutant varieties of Canna and Chrysanthemum were released by Kasetsart University. Dissemination of this nuclear technology in agriculture to the public was conducted via workshops and media, such as TV, radio, newsletters and newspapers.

Agriculture: Bio-fertilizer

In Thailand, collection and selection of effective strains for bio-fertilizer purpose and the inoculum production techniques were studied.

Public Information

OAP has hired consultant companies as advisors for conducting the public relations activity starting in 1999.

Radioactive Waste Management

The code of practice and the radioactive waste management regulation were drafted and proposed to the cabinet.

Strengthening Linkage between National Research Sectors and End-users, including Industry

A business development unit to serve as a bridge between the research and development arm of the newly established TINT and potential end-users is planned.

A feasibility study showed that it was untimely yet for Thailand to launch the nuclear power program due to inappropriate finances. However, nuclear power remains an important option for future energy development in Thailand.



The Philippines

H.E. Dr. Estrella F.
Alabastro, Secretary,
Department of Science
and Technology
(DOST)

The development agenda of the Government is strongly anchored on the goals of economic growth accompanied by social equity and ecological responsibility for the present and future generations of Filipinos. The Department of Science and

Technology (DOST) is giving priority to two important programs: The Small Enterprise Technology Upgrading Program or SETUP and Technological Innovation Commercialization Program or TECHNICOM. SETUP is to upgrade the productivity of small and medium enterprises (SME). TECHNICOM is designed to stimulate technological innovation, and maximize benefits from the result of government investments in R & D activities.

Our Department of Agriculture has evaluated the commercial application of irradiation as a quarantine treatment for Philippine fruits. In the area of mutation breeding, one leading ornamental company in Mindanao that participated in the Open Lecture held in conjunction with the FNCA 2003 Workshop on Mutation Breeding turned to use our irradiation facility.

A new medical cyclotron and Positron Emission Tomography (PET) center was inaugurated in 2001 in a private hospital, and has since served the needs of cancer patients. Philippine participation in the FNCA Project on Radiation Oncology is facilitating the development of the best protocols in the treatment of uterine cervix cancer and nasopharyngeal cancer.

Through the use of nuclear and analytical techniques, the PNRI maintains a database on fine particulate data in Metro Manila.

The Philippines would consider it our privilege to host the 9th FNCA in 2008.



National Science and Technology Policy for Development and Competitiveness and FNCA Activities

We live in a globalized world, a world that is highly competitive and increasingly becoming borderless. With the shift towards knowledge-based economy, the ability of a nation to continuously enhance proficiency in science, technology and innovation is becoming more important. The rapid development of capability and capacity in Science and Technology (S&T) is therefore needed to enable the country to sustain its economic growth in the future in line with the requirement of our Vision 2020. The Government has launched the Second National Science and Technology Policy and Plan of Action in June 2003. The Second S&T Policy has identified seven key strategic thrusts as follows:

- Strengthening research and technological capacity and capa-

bility

- Promoting commercialization of research outputs
- Developing human resource capacity and capability
- Promoting a culture for science, innovation and technoeentrepreneurship
- Strengthening institutional framework and management of S&T and monitoring of S&T policy implementation
- Ensuring widespread diffusion and application of technology, leading to enhanced market-driven R&D to adapt and improve technologies
- Building competence for specialization in key emerging technologies.

To support these strategic thrusts, the government identified 55 action plans or specific initiatives.

We would like to offer Malaysia as the venue for the seventh FNCA Meeting in 2006.

For the common interest to the FNCA countries, Malaysia propose a new project on the Expansion of Nuclear Medicine Services: Medical Application and Usage of Positron Emission Tomography (PET), Cyclotron and Radioisotopes. The introduction of this program is not only for the routine clinical use at the hospitals, but it will also include the support from nuclear research institution in the development of special radiopharmaceuticals and in ensuring the safety aspect. We believe this cooperation will contribute towards enhancing the quality of life of the people.



At the last FNCA Meeting in Seoul in 2002, we shared our views on the necessity for nuclear knowledge preservation as a preparatory measure for inducing the second nuclear Renaissance. We formulated a high-level task group for the human resources survey. Korea proposed to establish an “Asian Mutual Fund for Nuclear Liability” for securing a compensation mechanism related to the operation of nuclear power plants.

Korea has 18 NPPs supplying 40% of the nation’s electricity. 8 more NPPs will be constructed by 2015. 4 units will be the Korean Standard Nuclear Power Plants with a capacity of 1,000MWe, and 4 units will be the Advanced Power Reactor with a capacity of 1,400MWe (APR1400).

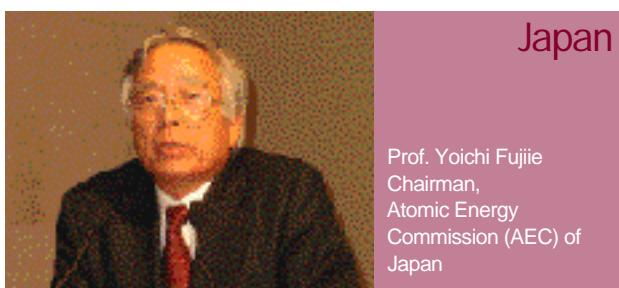
In the case of small and medium sized nuclear reactors, active research efforts have been devoted to the 300MW System integrated Modular Advanced ReacTor (SMART) pro-

gram. SMART can be utilized for seawater desalination as well as power production. Its pilot plant will be commissioned by 2008. Currently, the Korea / Indonesia / IAEA tri-party cooperation project for SMART's feasibility on the Madura Island is under implementation. Korea is ready to share SMART-related technology and experience with the FNCA countries. Furthermore Korea strives for expediting radiation technology (RT) development. Currently, electron accelerator technology for industrial wastewater purification is being commercialized. The pilot plant with a capacity of treating 1,000 tons of dye wastewater will be constructed in collaboration with the IAEA.

Recently, Korea has enacted two new legislations: The "Law on Radiation and Radioisotope", promulgated in December 2002, aims at promoting the utilization of RT, and, the "Law on the Physical Protection of Nuclear Material and Facilities and the Measures for a Radiological Emergency", enacted in May 2003. In this regard, Korea proposes the joint construction of a medical isotope producer (MIP) to be used exclusively for the production of radioisotopes for our common prosperity.

Korea has a 30MW multipurpose HANARO research reactor, the 1GeV Pohang Light Source Accelerator and the Korea-Superconducting Tokamak Advanced Research (K-STAR) facility. Korea suggests the FNCA devise a Regional Resources Management Function to assist in the sharing of the large-scale research facilities in Asia. Korea hopes the "Asian Nuclear Students Interchange Program" for fostering young specialists in our region be developed.

When Korea was faced with a financial crisis several years ago, nuclear energy continued to provide us with a stable supply of electricity at a low cost. That was the major driving force behind Korea overcoming the crisis in a short period of time. This proved to us that nuclear is a realistic energy source with the characteristic energy security. The economic growth rate of Asia was around 6.4% in 2002. Asia is the fastest growing region in the world. Nuclear energy will serve as an engine putting the Asian economy on a solid foundation. Korea is very willing to share its expertise and experiences in developing nuclear energy technologies with the other Asian countries.



Japan

Prof. Yoichi Fujie
Chairman,
Atomic Energy
Commission (AEC) of
Japan

Japan's Nuclear Energy Policy

The first Long-Term Program for Nuclear Research, Development and Utilization, issued in 1956 by the Atomic

Energy Commission, stated that "in order to establish the fuel cycle matched to the realities, Japan will endeavor to develop and improve technologies, including those for breeder reactors and nuclear fuel reprocessing". Our effort today is a continuation of one begun nearly five decades ago.

In addition, in the fight against global warming, nuclear power plays an important role for Japan. In October 2003, Japan's first "Basic Plan for Energy Supply and Demand" was approved by the cabinet. It positions nuclear generation as a key power source for Japan. The final target in Japan's nuclear-fuel-cycle program is the introduction of fast breeder reactors (FBRs) for the use and creation of plutonium. Since it will still take some time, however, to bring FBRs to the stage of commercial operation, we are promoting the burning of the mixed oxide (MOX) fuel in light water reactors (LWRs) as the first step toward the full use of plutonium.

Current State of Nuclear Power Generation

Recent years, public confidence in nuclear has been severely damaged. Starting in 2002 and continuing, as a result of falsifications of self-inspection records at nuclear power stations and other occurrences, overall availability factor of NPPs has been reduced. Similarly, as a result of falsification of MOX fuel data by the overseas manufacturer in 1999, MOX fuel program, too, is substantially delayed. As for the prototype fast breeder reactor (FBR) "Monju", that caused sodium leakage in 1995, our present intention is to remodel "Monju" and put it back into operation. With recognition that "Monju" is an important facility for the study of FBRs, we also plan cooperative research and international exchange activities.

The basic plan for merging the Japan Atomic Energy Research Institute (JAERI) and the Japan Nuclear Cycle Development Institute (JNC) includes international cooperation as a major mission of the new entity.

Nuclear Energy and the International Community

Japan's requisite in its utilization of nuclear energy is peaceful use. This is embodied in domestic policies and laws, international treaties and bilateral agreements by which Japan abides. Japan has a declared policy of not holding surplus plutonium - plutonium without specific purpose. This past August, the Atomic Energy Commission issued its "Basic Principles for the Utilization of Plutonium in Japan" in an attempt to further improve transparency.

The IAEA Additional Protocol strengthens its capabilities in inspection. Japan requests nations that have not concluded the Additional Protocol to do so soon.

The vision of the FNCA is to contribute to the development of societies and economies through active partnerships, on the basis of mutual understanding and cooperation. Japan will continue to promote international cooperation in Asia through the

FNCA and other frameworks.



Dr. Ashwin Sasongko,
Secretary Ministry of
Research and
Technology

Indonesian Policy on the Development and Utilization of Nuclear Energy

A law regarding the National System for Research, Development, and Application of Science and Technology was enacted by the Parliament to become Law No. 18, 2002. The Ministry of Research and Technology has more solid co-ordination programs among research and development institutions, universities, industries and NGOs to set the “Landmarks 2020”, which is focused at the supply security of food and energy, the two most essential objects for wealth creation to sustain the development. In Indonesia, the National Nuclear Energy Agency (BATAN), in cooperation with the Ministry of Agriculture, continues to join the FNCA activities in mutation breeding and bio-fertilizer. In responding to some customer taste satisfaction, three new varieties of rice have been released in the year 2003, namely: Kahayan, Winongo and Diah-suci. Utilization of mutation breeding techniques for “bio-oil” plants producing more bio-diesel than crude palm oil, continues to be investigated.

Although Indonesia is recognized as an energy exporter, the energy source per capita is relatively small while the reserve locations are not so favorable as compared to the places of domestic demands. The Final Report of the Indonesian - IAEA study named “Comprehensive Assessment of Different Energy Sources (CADES) for Electricity Generation in Indonesia” had been carried out in 2001 - 2002 was submitted to the President of Indonesia on August 6, 2003. The report indicates that the energy mixed strategy has to be applied by considering all of energy sources available in Indonesia, including NPP for electricity generation to fulfill Java - Bali grid starting at about 2016. The total share of nuclear energy is expecting to be around 5 % of the total electricity generation in the year 2025, i.e. about 6,000 MWe. Use of nuclear energy in the Long-term National Energy Policy is being drafted. We expect that the consultation with Parliament on the use of NPP as stipulated by Nuclear Energy Act No. 10 year 1997, can be done by sometime next year.

The Clean Development Mechanism (CDM) should be applicable also for the NPP projects as mentioned in the Kyoto Protocol.

A preliminary study on the use of electron beam machine for treatment of effluent gas from the coal power plant in Suralaya,

has been performed. By the end of this year, a home-made low energy electron accelerator is to be commissioned at BATAN’s facility in Yogyakarta.

Indonesia is strengthening the nuclear licensing authority BAPETEN (Indonesia Nuclear Control Board). It is also important for the preparation of the NPP.



H. E. Zhang Huazhu,
Chairman,
China Atomic Energy
Authority (CAEA)

Development and Prospects of the International Nuclear Power Market

Nuclear power has a history of more than 50 years ever since the American EBR-1, the first nuclear facility, generated electricity in December 1951, and USSR’s first NPP began to transmit electricity to the power grid in June 1954. After two accidents of US’s Three Mile Island and the USSR’s Chernobyl, the construction cycle of nuclear power plant was prolonged, investment increased and its economic competitiveness declined. These discouraged the investors and effected the further development of nuclear power. The new century, however, brought new opportunities. The US, France, Russia and other countries determined to continue the development of nuclear power. Countries such as China, Japan, the Republic of Korea, India, Pakistan and Viet Nam are willing to expand their nuclear power production capacities or plan to develop nuclear power, making Asia the most eye-catching region in the world’s nuclear power development.

Development Prospect of Nuclear Power in China

China’s total installed power capacity reached 356 GW in 2002 and annual power output ranked the second in the world. As a large country with a population of 1.3 billion, China is with an installed capacity per capita of 0.27 kW, ten times lower than many developed countries. The present energy mix is far from rational. The national total power generation reached 1,654.2 TWh, of which thermal power accounted for 81.74%, hydro power 16.6% and nuclear power a mere 1.6%. According to the general economic development strategy, China’s GDP will redouble by 2020. The installed capacity of nuclear power will reach 32,000 MW if nuclear accounts for 4% of the total by 2020. In other words, about 20 nuclear power units of 1,000 MW are to be constructed.

Development of Nuclear Technology Application in China

We have noted “the effect of nuclear technology on social and economic development”. In China, in the sector of industry, various radiation appliances and nuclear instruments are widely used in production, process control, non-destructive inspection, chemical analysis, resource prospecting, etc., and have yielded remarkable social and economic benefits. In agriculture, nuclear technology is playing positive roles in irradiation breeding, soil improvement, insect's sterilization, keeping food fresh, and increasing the reproductivity of livestock. The increasing application of nuclear medical equipment, appliances and medicine in radioactive diagnosis and radiotherapy has done contribution to the health of the mankind. Nuclear technology is also demonstrating growing importance in environmental protection and water management. Traditional industries with application of nuclear technology yielded an output of \$2 billion in 2002, accounting for around 0.16% of GDP. Among this, the output of nuclear agriculture was \$500 million, radioactive chemical products \$400 million, isotope instrument \$375 million, Gamma-ray irradiation products \$690 million, and isotopes and their products \$50 million. We admit, however, there is still a big gap between China and developed countries.

We wish to have a wide-ranging exchange and cooperation with other Asian countries in nuclear energy development and technology applications to make due contribution to environmental protection and sustainable economic development of the whole world.



Recent Events Related to Nuclear Science and Technology in Australia

The budget for replacement of the research reactor HIFAR of the Australian Nuclear Science and Technology Organisation (ANSTO) is A\$286.4 million (1997 value) and is historically the largest investment by Australian Government for a single research facility.

Replacement Research Reactor

ANSTO signed a contract in mid-2000 for the design, construction and commissioning of a 20 MW research reactor with the Argentine company INVAP S.E. In April 2002, the

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) issued a construction license for the reactor, and construction commenced, and the construction will be complete in 2006. The new reactor will achieve neutron flux performance levels at least ten-times higher than those of HIFAR. This will be competitive with the best facilities anywhere in the world. The Government has endorsed it becoming a regional center of excellence.

Radioactive Waste Management

Australia does not generate any high level radioactive waste. Currently some 500 cubic meters of intermediate level waste are being stored in a variety of sites around the country. For the low-level radioactive waste, the Government has determined to construct a single national repository. In July 2003 the Government announced its acquisition of the national radioactive waste repository (NRWR) site “Site 40a”, and in August 2003 the Government applied to the ARPANSA for a facility license for three activities on the NRWR: to prepare “Site 40a”, to construct the NRWR, and to operate it.

Recent Regional Cooperation Activities under FNCA Safety Culture Workshop

The FNCA Safety Culture Workshop was held in Dalat, Viet Nam in January 2003. A key feature was the production of safety status reports on specific research reactors in each country. The peer review process of the Dalat nuclear research reactor went well and covered a lot of ground. The participants agreed to continue the peer review and the self-assessment reporting at the next workshop.

Wrap-up Session

The representative of Viet Nam proposed that the 5th FNCA Meeting be held in autumn 2004 in Viet Nam.

Welcome Reception



Talks among Messrs. Hoang Van Huay, Vuong Huu Tan, Sueo Machi and Toshimitsu Motegi

Fifth FNCA Coordinators Meeting (CM)

Wed. March 3 - Fri. March 5, 2004

Session 1: Summary Report on Activities of FY2003 and the Fourth FNCA Meeting in Okinawa

Session 2: Country Report on FNCA Activity Progress

Session 3: Activities Starting in FY2004

- Role of Nuclear Energy for Sustainable Development in Asia
- Application and Usage of PET, Cyclotron and Radioisotopes in Medicine

Session 4: Discussion on Improvement of Implementation Efficiency of FNCA Activities:

Invited Speech: RCA Program

Welcome Reception

Session 5: Discussion on Progress and Future Plans of FNCA Projects

Session 6: Discussion on the Minutes of the 5th FNCA CM
Announcement of the 5th FNCA Meeting in Viet Nam.

Technical Visit to National Institute of Radiological Sciences

List of Head Delegates to the Fifth CM

(*) FNCA National Coordinator

Australia	Dr. John F. Easey Australia Nuclear Science and Technology Organisation (ANSTO)
China	Mr. Huang Wei China Atomic Energy Authority (CAEA)
Indonesia	Dr. Hudi Hastowo (*) National Nuclear Energy Agency (BATAN)
Japan	Dr. Sueo Machi (*) Atomic Energy Commission (AEC) of Japan
Korea	Dr. Jong-Bae Choi (*) Ministry of Science & Technology (MOST)
Malaysia	Mr. Adnan Haji.Khalid(*) Malaysian Institute for Nuclear Technology Research (MINT)
The Philippines	Dr. Alumanda M. Dela Rosa(*) Philippine Nuclear Research Institute (PNRI)
Thailand	Mr. Pathom Yamkate(*) Office of Atoms for Peace (OAP)
Viet Nam	Prof. Vuong Huu Tan(*) Vietnam Atomic Energy Commission (VAEC)
IAEA	Prof. Prinath Dias

Highlights of the Fifth CM

Two new proposals were presented namely: the Panel on “Role of Nuclear Energy for Sustainable Development in Asia” by Japan, and the project on “Application and Utilization of Positron Emission Tomography (PET), Cyclotron and Radioisotopes in Medicine” by Malaysia. The evaluation of FNCA projects will be carried out in 2004 and 2005.

The Fifth FNCA Meeting in 2004 in Ha Noi will be held under the basic theme of “Nuclear Human Resources Development Cooperation in Asia”.

Record of the 5th FNCA Coordinators Meeting

1. Opening Session

The Fifth Coordinators Meeting (CM) was held from March 3 through 5, 2004 in Tokyo, Japan, hosted by the Cabinet Office (CAO) and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan.

Dr. Sueo Machi, the Commissioner of Atomic Energy Commission of Japan (and FNCA Coordinator of Japan) gave the welcome remarks at the Opening Session.

The Meeting was participated by delegates from FNCA countries, i.e., Australia, the People’s Republic of China, Indonesia, Japan, the Republic of Korea, Malaysia, the Philippines, Thailand and Viet Nam, and the IAEA representative participated as an observer. (Attachment 1: List of Participants). The program of the Meeting is given to Attachment 2.

2. Session 1

In Session 1, Dr. Sueo Machi, the FNCA Coordinator of Japan gave a summary report of activities in FY 2003 and the Fourth FNCA Meeting in Okinawa, Japan (Ministerial Level Meeting [MM] and Senior Officials Meeting [SOM]) (Attachment 3). He cited some significant achievements of ongoing projects. The Fifth Coordinators Meeting took note of the report.

3. Session 2

In Session 2, the FNCA Coordinators and representatives made the presentation of country reports on the progress and future plans of the FNCA projects (Attachment 4).

4. Session 3

In Session 3, two new proposals were presented namely: the Panel on “Role of Nuclear Energy for Sustainable Development in Asia” and the project on “Application and Utilization of Positron Emission Tomography (PET), Cyclotron and Radioisotopes in Medicine”. (Attachment 5)

a) Dr. Machi introduced the outline and work plan of the Panel on “Role of Nuclear Energy for Sustainable Development in Asia”, explaining the background and the importance of this study by showing statistic figures on energy situation in the Asia region. According to him, the Panel is to study the long-term energy plan for 20 to 50 years by comparing production cost of energy resources, reduction of greenhouse gas (GHG) emission. The possibility of introducing nuclear power, and usefulness of non-power application will be also examined. It is proposed to hold the first meeting of the Panel some time between August and October in 2004 in Japan.

It is suggested that the Panel consider the relevant data, soft-



Group Photo of 5th
FNCA Coordinators
Meeting

ware and expertise from IAEA/RCA activities. The Meeting confirmed again that FNCA and RCA should strengthen synergy and complementarity.

The Meeting agreed that the Panel should address the following issues: the role of nuclear energy in relation to energy security and global warming, mechanism to implement nuclear power program, and the outreach activities to get better understanding and acceptance of nuclear power. The Meeting emphasized its support for the work scope of the Panel. Strategic energy planning is important for all countries including those without immediate plans to use nuclear power. Dr. Machi also stressed the importance of participation of experts from environmental and energy sectors together with the nuclear sector in the Panel.

- b) Dr. Mohamed Ali Abdul Khader of Malaysia presented the new project on "Application and Utilization of Positron Emission Tomography (PET), Cyclotron and Radioisotopes in Medicine". It is expected that all participating countries could share their useful experiences and information on PET and cyclotron technology. It is suggested that Malaysia should make a more detailed work plan for the implementation of the project. The Meeting endorsed the proposal, and the project is scheduled to start in FY 2005. The Meeting noted that some countries which already have PET and cyclotron such as Australia, the People's Republic of China, Japan, the Republic of Korea, and the Philippines could share their experiences with other countries, which have plans to install similar facilities in the near future. The Meeting also stressed the importance of the maintenance of the PET and cyclotron.

5. Session 4

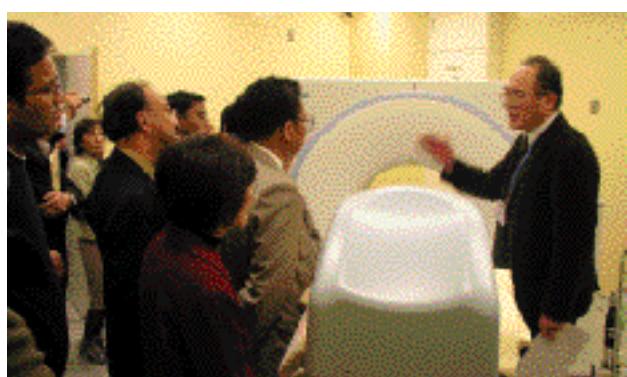
In Session 4, Dr. Machi presented the paper on efficient implementation of FNCA activities. He outlined the FNCA management scheme of Japan for implementing the FNCA projects. He presented specific issues that needed to be addressed to enhance socio-economic impact such as the application of Mo-99 adsorbed PZC columns for Tc-99m genera-

tors, NAA measurements for environmental monitoring, and extension of biofertilizer applications to farmers.

On the implementation of the Panel on "Role of Nuclear Energy for Sustainable Development in Asia", the FNCA Coordinators were encouraged to coordinate and work closely with environmental policy and energy planning officials.

The Meeting also discussed the evaluation of FNCA projects especially performance indicators and procedures for evaluation.

- a) Dr. Easey of Australia suggested that outputs should be evaluated as they were directly resulting from the activities. Outcomes came from outputs but there was less control over them. Dr. Machi proposed in-house evaluation to be carried out objectively. Dr. Huang of China advised that other experts in the field were included.
 - b) Dr. Dias, RCA Coordinator, informed the Meeting that the IAEA/RCA applied the logical framework matrix and the involvement of end-users in the design of the project.
 - c) Mr. Adnan added that any FNCA/IAEA project should be an integral part of a relevant national project.
 - d) Dr. Easey said that good information on the cost benefit of nuclear techniques and their effectiveness was very important in furthering its utilization. He said that he has not been able to find such information on cost benefit and he suggested that the FNCA projects should consider this aspect.
- Dr. Dias presented an overview of the IAEA/RCA activities.



Technical Visit to PET facility, National Institute of Radiological Sciences (NIRS)

The Meeting recognized the importance of close linkage and synergy between IAEA/RCA and FNCA activities.

6. Session 5

In Session 5, FNCA projects in eight fields were discussed and reviewed. The Meeting approved the activities of on-going projects and their future plans. The Meeting agreed to the tentative schedule for workshops/meetings under the FNCA framework together with venues shown in Attachment 6. Major points discussed and/or agreed upon for each project were shown in Attachment 7. The three-year work plan of each project was also approved as shown in Attachment 8.

7. Session 6

In Session 6, the Fifth FNCA Meeting on November 23-24, 2004 in Ha Noi was announced by the Representative of Viet Nam. The Meeting will be held under the basic theme of "Nuclear Human Resources Development Cooperation in Asia". It was proposed to create a network with the aim of pro-

moting the FNCA countries' contribution to Human Resources Development (HRD) in the region, which would enable personal exchange and joint activities.

8. Closing Session

In the Closing Session, the Minutes of the Coordinators Meeting was adopted by the delegates. Mr. Masanori Shinano, Director for International Nuclear Cooperation of MEXT, gave the closing remarks, and officially closed the Fifth FNCA Coordinators Meeting.

9. Technical Tour

A technical tour to the National Institute of Radiological Sciences (NIRS) was made on March 5, 2004. The facilities including PET, cyclotron, and the Heavy Ion Medical Accelerator in Chiba (HIMAC) were shown to the delegates.

N.B. The above Attachments except Attachment 3 are omitted in this document.

Highlights of FNCA Project Activities

March 3-5, 2004, Tokyo, Japan
Dr. Sueo Machi, FNCA Coordinator of Japan

Attachment 3

(1) Tc-99m Generator Production

New projects on "Tc-99m Generator Production" using Mo-99 produced by (n, γ) reaction and Poly-Zirconium Compound (PZC) adsorbent have remarkable progress in design of production system in Japan and Indonesia. The demonstration of manual production was made in BATAN at the Workshop in 2003. A larger scale automatic plant for loading Mo-99 adsorbed PZC has been installed in BATAN, Indonesia in December 2003. The demonstration of the plant operation was performed during the Workshop in January 2004. BATAN-Kaken Joint Patent on the PZC based Tc-99m generator and Mo-99 loading machine has been already applied in Japan (Oct. 31, 2002) and Indonesia



Automatic loading machine for Mo-99 adsorbed PZC

(Feb. 24, 2003).

Future plans:

- 1) Quality assurance test of the Mo-PZC loaded column in Indonesia.
- 2) Loading plant installation in FNCA countries with the technical support of Japan in 2004 and 2005.

(2) Neutron Activation Analysis (NAA) for Monitoring Airborne Particulates

The particulate samples were collected in each country using common filters provided by Japan, in urban and rural areas to be analyzed by the NAA. The monitoring are being continued and the compiled report will be published



Sample collection of airborne particulates

in the 1st quarter of 2004. “Ko-method”, which improves efficiency of NAA to be affordable in measurement of large number of environmental samples is being developed by the collaboration of the Chinese, Vietnamese and Japanese experts.

Future plans:

- 1) Pollution monitoring data of airborne particulates in urban and rural areas in FNCA countries will be compiled in 2004
- 2) Ko-method of NAA should be established in collaboration with IAEA in 2004
- 3) Results of NAA measurements of airborne particulates should be used for the planning of environmental control of FNCA countries. In this regard the coordination with ministry responsible for environmental control should be strengthening.
- 4) The proposal of Viet Nam to monitor pollution of sea water in coast will be implemented by the measurement of sediment and/or biota in the sea coast using NAA after 2004.

(3) Neutron Scattering

The project on “Neutron Scattering” is focusing on application of the small angle neutron scattering (SANS) for studying structure of natural polymers produced in the FNCA countries. In 2003 one scientist from Thailand and one from the Philippines have studied the structure of the modified natural rubber and carrageenan, respectively in Japan in collaboration with the University of Tokyo, Kyoto University and JAERI. Structure of industrial polymers was also studied.

Future plans:

- 1) Expert meeting on the project will be held in Indonesia in 2004 to discuss the specific applications of SANS which meet industrial research needs and common interests of FNCA countries.
- 2) The study on the structure of natural and industrial polymers will be continued in 2004.

(4) Mutation Breeding

The project on “Mutation Breeding” has started a new specific activity in 2002 with participation of China, Indonesia, the Philippines and Viet Nam to develop new varieties of the drought-tolerant sorghum and soybean, and activity of insect-resistant orchid in 2003 with participation of Indonesia, Malaysia and Thailand. Experimental materials of soybean, sorghum and orchid have been exchanged between the participating countries. Better mutant variety of sorghum has been developed in Indonesia. Malaysia and



Exchange of experimental materials of orchid at the Workshop in 2003

Indonesia are about to join “soybean” activity in 2004.

Future plans:

- 1) Selection of better mutant varieties of sorghum, soybean and orchid will be continued and intermediate results will be reviewed in 2004.
- 2) Mutation breeding for disease resistant banana will be started by Indonesia, Malaysia, the Philippines and Viet Nam in 2004.
- 3) In order to increase kinds of mutant, the utilization of the ion accelerator of JAERI may be facilitated by the FNCA Coordinator of Japan responding the specific request of FNCA countries.

(5) Biofertilizer

The 1st Workshop of the project on “Biofertilizer” has formulated the work plan in 2002 and 2003 including the field demonstration in participating countries to show impacts of the biofertilizer. The 2nd Workshop in Viet Nam was jointly organized with JSPS Research Project of Biofertilizer with participation of the IAEA and ICRISAT experts. Field demonstration of biofertilizer (Rhizobia) for peanuts in Viet Nam was successful. The strategy for



Peanuts with biofertilizer

Peanuts without biofertilizer

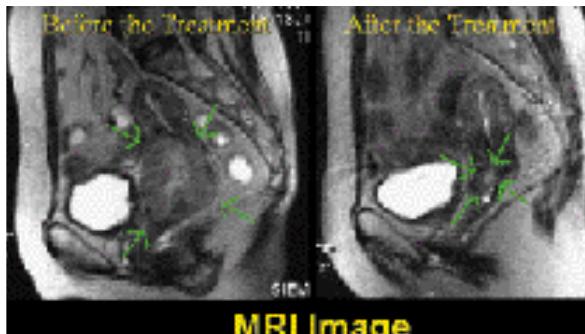
extension of biofertilizer was formulated in each country.

Future plans:

- 1) Strategic demonstration of biofertilizer application in less-fertile soil in 2004 and 2005
- 2) Pilot production of biofertilizer using radiation sterilization of carriers in 2004 and 2005
- 3) Support of IAEA for measurement of N₂ fixing using N-15

(6) Radiation Oncology

The project on the radiation therapy of uterine cervix cancer has achieved remarkable progress. The clinical study on radiation therapy using the standard protocol "CERVIX-I" in FNCA participating countries. This treatment regimen produced a favorable outcome, with the 5 year overall survival and local tumor control rates for stage IIIB patients being 52.5% and 81.5% respectively. These results were comparable with or somewhat superior to those of the American and European series. The guidebook on the treatment protocol "CERVIX-I" has been published in 2002 for radiation oncologist. In conjunction with the FNCA Workshop, the Open Lecture on "Radiation Therapy" was presented for 150 audiences in 2003 in Tokyo. A clinical study on chemo-radiotherapy for advanced uterine cervix cancer has been conducted since 2003.



Radiation Therapy of Uterine Cervix Cancer

Future plans:

- 1) The clinical test on chemo-radiotherapy for advanced uterine cervix cancer will be fully implemented in 2004.
- 2) The clinical study on chemo-radiotherapy for nasopharyngeal cancer also will be preliminarily studied in 2004.
- 3) Activities on QA/QC of radiation therapy in 2004

(7) Public Information (PI) for Nuclear Energy

In this area, a joint cross-national survey on "radiation" was carried out in seven FNCA countries. In each country, a total of 1,100 male and female high-school students served as respondents. The results of the survey are expect-

ed to serve for improving the strategy for effective communications.

Under the FNCA Regional Speakers Bureau Activity, three speakers were sent to the INC'02 in Malaysia in 2002 and one speaker to the NuTech 03 in Thailand.

In conjunction with Project Leaders Meeting in Viet Nam in 2003, two Open Seminars were held on "Public Information Strategies for Developing Nuclear Power" in Hanoi and "Application on Radiation Technology in Industry in Ho Chi Minh City". More than 200 local specialists attended the both seminars.

Future plans:

- 1) In order to enhance communications with mass media, national seminars will be organized in each country in 2004, where the FNCA will facilitate (provide) necessary means (experts).
- 2) The possibility for the FNCA to train nuclear communicators will be explored also in 2004.
- 3) It is proposed that FNCA's Web-site (<http://www.fnca.jp/english/>) should be improved by more active participation of all FNCA countries by increasing the two-way traffic of information in 2004.
- 4) It is recommended that the next PL meeting will be held in Thailand in 2004 in conjunction with an Open Seminar on "Research Reactor Application for Science and Industry".



Students answering the questionnaire in Viet Nam

(8) Radioactive Waste Management (RWM)

The Task Group for the sub-project on "Spent Radiation Source Management" (SRSM) had useful visits to relevant facilities to have fruitful discussion in Indonesia and Korea in 2002. Activity report of this SRSM Task Group was published in March 2003. The consolidated report on RWM has been completed in February 2003, which contains useful updated information. It was agreed that the sub-

project on "TENORM" replaces "SRSM". Expert group visited Malaysia and Viet Nam to assess the safety of TENORM (Technologically Enhanced Naturally Occurring Radioactive Materials) management in 2003.

Future plans:

- 1) Expert group visits to Thailand and China to assess safety of TENORM management in 2004.
- 2) Review of National Radiation Safety Standard status in accordance with IAEA Basic Standard
- 3) Characterization and classification of wastes for each FNCA country

(9) Nuclear Safety Culture (NSC)

The self-assessment of research reactors has been conducted in each FNCA country in order to identify the areas for further improvement in fostering safety culture and management. The first peer review of safety culture for research reactor was carried out successfully in Viet Nam on the research reactor of Da Lat Nuclear Research Institute in January 2003. Some useful comments and information were presented for Vietnam Atomic Energy Commission (VAEC) to take into account for the improvement of safety culture.



Peer review team in Da Lat, Viet Nam

Future plans:

- 1) Peer review of HANARO (High-flux Advanced Neutron Application Reactor of KAERI) safety culture in 2004
- 2) Self-assessment of safety culture in each FNCA country in accordance with IAEA Codes of Conduct
- 3) Review of the project outcome in the past years

(10) Human Resources Development (HRD)

The development of the common training materials in radiation protection area and introduction of e-learning sys-

tem, are being progressed. The survey of basic data on HRD such as, currently available human resources and the demand to meet national program are being carried out in FNCA countries, which should be used to formulate a national strategy of HRD and the strategy of FNCA's HRD project. The matter of regional networking for research, high education and training was raised at the Workshop and the 3rd FNCA Meeting.

Future plans:

- 1) National HRD strategy should be drafted based on results of the survey of HRD database to be discussed at the HRD Workshop in 2004
- 2) Preparation of a model method for HRD strategy formulation in 2004
- 3) The FNCA approach to ANENT should be examined

(11) Application of Accelerators

According to the work plan at the 2nd Workshop, demonstration for liquid system was conducted by the JAERI, Japan in December 2002.

The 3rd Workshop on Application of Electron Accelerators was held at Kuala Lumpur, Malaysia, where the status of utilization of electron accelerator for thin films in the participating countries was discussed and the future program was formulated. The demonstration for thin film irradiation was achieved in MINT Malaysia 2003. The Cost analysis of the low energy electron process is in progress.



Demonstration to prepare thin film to be irradiated

Future plans:

- 1) Demonstration of flue gas treatment in China in 2004
- 2) Evaluation of radiation processing of liquid, solid, and gas samples by low energy electron accelerator

What is the Forum for Nuclear Cooperation in Asia (FNCA)?

Appellation;

Forum for Nuclear Cooperation in Asia (FNCA)

Member Countries;

Australia, China, Indonesia, Japan, Korea, Malaysia, the Philippines, Thailand, and Viet Nam

* IAEA as observer

Framework;

The following are the basic outline of cooperation.

1. Ministerial Level Meeting (MM);

Ministerial level representatives responsible for nuclear research, development and utilization attend to discuss nuclear policy or cooperative measures. Senior Officials Meeting (SOM) is attached to MM as an assistant organization.

2. Coordinators Meeting;

One FNCA Coordinator was appointed for each country, and these Coordinators discuss introduction, modification, abolishment, coordination, evaluation, and so on, of cooperative projects.

3. Cooperative activities for each project.

Vision Statement

The FNCA is to be recognized as an effective mechanisms for enhancing socio-economic development through active regional partnership in the peaceful and safe utilization of nuclear technology”.

March 1990; The first International Conference for Nuclear Cooperation in Asia (ICNCA) was held in Tokyo hosted by the Atomic Energy Commission of Japan. This series of ICNCA meetings had been held in Tokyo every March until 2000.

1991; Four fields of activities started as Utilization of Research Reactors, Application of Radioisotopes and Radiation for Agriculture and Medical Care, Public Information of Nuclear Energy.

1995; Field of Radioactive Waste Management was added.

1997; Field of Nuclear Safety Culture was started by Australia.

March 1999; At the tenth ICNCA, reorganization to the FNCA was agreed upon .

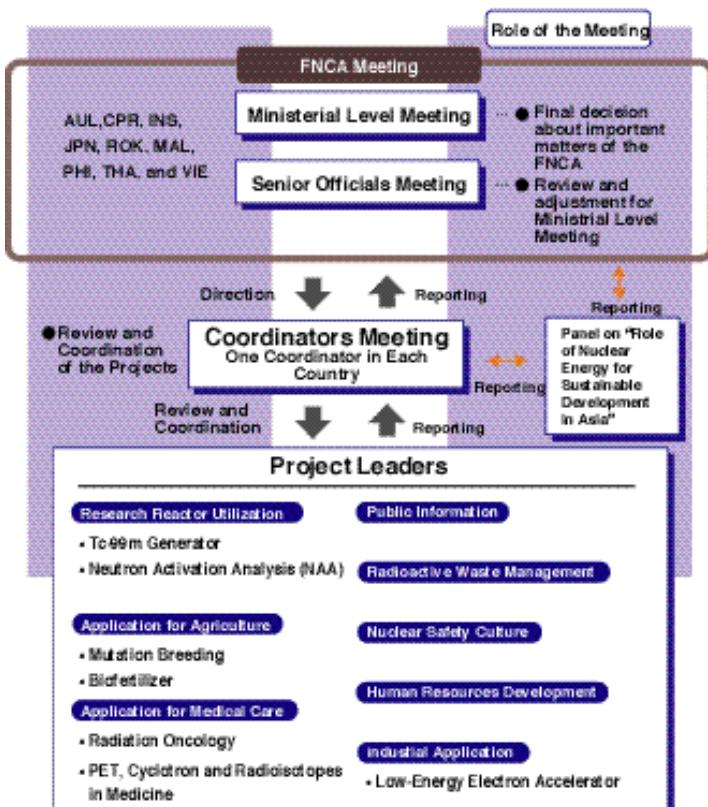
1999 ; Field of Human Resources Development was started.

November 2000; The first FNCA Meeting was held in Bangkok co-hosted by the Ministry of Science, Technology and Environment of Thailand, and the Atomic Energy Commission of Japan. Successive FNCA Meetings were held in Tokyo, Seoul, and Okinawa respectively.

2001; Electron Beam Accelerator project was started.

December 2003 ; At the Fourth Meeting, Japanese proposal of panel on “Role of Nuclear Energy for Sustainable Development in Asia”, and Malaysian proposal of project on “Application and Usage of PET, Cyclotron and Radioisotopes in Medicine” were endorsed.

The FNCA Framework



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