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Forum for Nuclear Cooperation in Asia
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Regional Cooperation for Nuclear Science and Technology

Malaysia's Perspective

Prior to the Third FNCA Meeting, the Honorable Dato' Law Hieng Ding, Minister of Science, Technology and the Environment (MOSTE) of Malaysia, who has been attending the FNCA since 1991, talked about Malaysia's perspective on regional cooperation in nuclear science and technology. Views of Ministers in charge of nuclear science in FNCA countries will be published at following issues.

The Hon.Dato' Law Hieng Ding
Minister, Ministry of Science, Technology and the Environment (MOSTE)

Malaysia has long recognized that science and technology (S&T) play an important role in the socio-economic development of the county. With this realization, S&T is now an integral part of the development of Malaysia. Various policies were formulated and programmes established to support S&T development in Malaysia. As the economy of Malaysia is now shifted towards knowledge-economy, more emphasis is given to activities related to research and development (R&D) and in the commercialization of research results. The priority areas for R&D which are of relevance to the needs of the country have also been established in areas such as information and communication technology (ICT), biotechnology, advanced materials, aerospace, pharmaceutical, advanced manufacturing and energy.

In establishing the national S&T progamme, Malaysia realized that it should not be carried out in isolation. Instead, it should be done out in partnership and close cooperation between the public and private sectors as well as international cooperation. Malaysia has used all avenues of cooperation especially the multilateral, regional and bilateral programmes to acquire new technology to strengthen her national programme as well as sharing her experiences in the development of S&T. The cooperation has also enhanced networking and partnership between the local and foreign institutions in order to implement the S&T programme more efficiently and effectively.

Malaysia is pleased that the cooperation in nuclear S&T in the Asian region has been established for more than 12 years since the establishment of "International Conference for Nuclear Cooperation in Asia (ICNCA)" in 1990. This cooperation has been further strengthened under the "Forum for Nuclear Cooperation in Asia (FNCA)" with the participation of 9 Asia countries. All the areas of cooperation such as the application of isotopes and radiation in agriculture and medicine, industrial application of waste management, safety culture, human resource development and public information are important for the development of nuclear S&T in Malaysia. Besides assisting Malaysia with her current activities, FNCA has also been a perfect complement to other regional nuclear cooperation programmes such as the "Regional Cooperative Programmes for research, development and training in the Asia and Pacific Region (RCA)" under IAEA.

To ensure the success of the cooperative programme, strong commitment is required from all the member countries. In addition, effective mechanism and management are also required to monitor the implementation of the projects and to ensure optimum benefits to the end-users.

The regional cooperation has also contributed towards sustainability of nuclear S&T in the region. This is due to the nature of the activities carried out in the cooperative programmes which gives greater emphasis on skills development, training and introduction of new technology. As the level of development of nuclear S&T in the region varies from one country to another, it is also important that certain activities should be directed towards supporting in-country programme. This in the long run will help to build up the nuclear S&T capability of the country.

(DATO' SERILAW HIENG DING)

The Third FNCA Meeting to be Held in Korea

-- Basic Theme: "Atoms for the Next Generation" --

With the basic theme "Atoms for the Next Generation," the Third Meeting of the Forum for Nuclear Cooperation in Asia (FNCA) is to be held in Seoul, Korea, on October 30 - 31, 2002. The first meeting was in Bangkok, Thailand, in 2000, and the second was in Tokyo last year. Ministerial level participants from nine FNCA countries will take part in the meeting, which consists of a Senior Official Meeting (SOM), a Ministerial Level Meeting (MM), a preparatory meeting for the MM, and a regular meeting. Participants will discuss and exchange views on sustainable development and the role of nuclear energy, human-resource development, and more.

International Conference Center "COEX" in Seoul, Korea

The FNCA meeting, consisting of ministerial level officials representing the nine member countries – Australia, China, Indonesia, Korea, Malaysia, the Philippines, Thailand, Vietnam and Japan – is the supreme decision-making body of the FNCA. Comprehensive issues of nuclear policy, including nuclear cooperation and peaceful utilization of nuclear science and technology in Asia through the FNCA framework, are to be discussed.

Given the growing demand for energy, food and resources spurred by economic development and rising populations, clean, reliable nuclear power is expected to play a key role in Asia. Nuclear science and technology, such as applications of radioisotopes and radiation in the fields of health, agriculture and industry, are similarly expected to add to the quality of life in Asian countries.

From this viewpoint, the meeting in Seoul will take up nuclear policy issues including the role of nuclear science and technology in sustainable development, for example, in the battle against global warming, applications in agriculture, and human-resource development, the latter indeed indispensable for future nuclear deployment in Asia.

Eleven FNCA projects in eight fields, including new projects agreed to at the FNCA Coordinators Meeting last March – "Applications of Low Energy Electron Accelerators" and "Biofertilizer" – are on the agenda to be approved at the meeting.

The following Ministers and Ministerial Level Officers from the nine FNCA countries were invited to the Third FNCA Meeting:

Australia *Prof. Helen Margaret Garnett*
Exective Director, Australian Nuclear Science and Technology Organization (ANSTO)

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

Indonesia *H.E. Mr. Hatta Radjasa*
Minister, Ministry of Research and Technology

Japan *H.E. Mr. Hiroyuki Hosoda*
State Minister for Science and Technology Policy
Prof. Yoichi Fuji-ie
Chairman, Atomic Energy Commission (AEC)
Mr. Tetsuya Endo
Vice-Chairman, AEC
Mr. Tetsuo Takeuchi
Commissioner, AEC

Korea *H.E. Dr. Young Bok Chae*
Minister, Ministory of Science and Technology (MOST)

Malaysia *The Hon.Dato' Law Hieng Ding*
Minister, Ministry of Science, Technology and the Environment (MOSTE)

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

Thailand *H.E. Mr. Pinit Jarusombat*
Minister, Ministry of Science and Technology (MOST)

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

Sponsored by: Ministry of Science & Technology (MOST) of Korea Atomic Energy Commission (AEC) of Japan
Date: Wednesday, October 30 - Thursday, 31, 2002
Place: ASME Hall, COEX (Seoul, Korea)
Basic Theme: "Atoms for the Next Generation"
Tentative Schedule:
<Oct. 30>Senior Official Meeting (SOM)
<Oct. 31>Ministerial Level Meeting (MM)
- Opening Session
- Report of Progress of FNCA Activities
- Presentation of Country Reports
- Round Table Discussion (exchange of views regarding role of nuclear science and technology in sustainable development in Asia, human resources development in nuclear field, etc.)
- Closing Session
- Press Conference
- Dinner jointly hosted by Minister of MOST of Korea and Chairman of AEC of Japan

Shifting from Information-Exchange to Problem-Solving

-- FNCA Project Highlights --

Based on the agreement at the Third Coordinators Meeting (CM) of the Forum for Nuclear Cooperation in Asia (FNCA) held in March 2002, in Tokyo, FNCA projects have moved into a new phase. Specifically, they have shifted from a conventional meeting-oriented approach to one of "problem-solving," linked more closely with the technological and socio-economic needs of the FNCA countries. Accordingly, three new FNCA projects – "Tc-99m Generators in the Field of Research Reactors," "Biofertilizers in the Field of Agriculture," and "Low-Energy Electron Accelerators in the Field of Industry" – are now fully under way. In previously launched projects, activities have also been initiated from the new problem-solving point of view, in light of the needs of the participating countries. Highlights of the FNCA projects are presented below.

Highlights of New FNCA Projects

Tc-99m Generator Project

Technetium (Tc) 99m is very useful as a diagnostic radioactive isotope in nuclear medicine, used for early detection of cancer. Given the tremendous demand for it, however, supply systems are not necessarily adequate, and Asian countries, including Japan, depend on imports for almost all of what is needed. They use valuable foreign currency for those imports, and also run the risk that imports could be suspended due to conditions in the exporting countries, for example, strikes.

This project is to develop low-cost Tc-99m production technology (using a poly-zirconium compound :PZC as an absorbent), and to disseminate that technology among Asian countries.

In order to obtain highly concentrated Tc-99m solvent suitable for medical diagnostics, the parent nuclide Mo-99 should be maintained at a high level of concentration. Conventionally, however, as there was no highly efficient Mo absorbent, Mo-99 with very high specific activity was produced using the fission reaction of enriched uranium. This was troublesome in terms of the management of nuclear materials and the treatment of waste.

PZC, developed by the Japan Atomic Energy Research Institute (JAERI) and Kaken Co., is an epoch-making absorbent with a capability almost 100 times that of the conventional absorbent Alumina. This will make it possible to produce Tc-99m using Mo-99 of low specific activity (2 Ci/g), which can be obtained by normal neutron activation, rather than depending Mo-99 of high specific activity (10,000 Ci/g). As a result, no facility to handle fissile materials will be required, meaning a substantial reduction in cost. The technology is suitable for developing countries.

Poly Zirconium Compounds (PZC)

In this project, demonstration of a Tc-99m generator with PZC will be undertaken in JFY2002; comparative evaluations of performance among different types of Tc-99m generators will be done in JFY2003, and labeling tests of radio-pharmaceuticals produced from Tc-99m using PZC will be conducted in JFY2004.

Biofertilizer Project

As of 2000, 3.7 billion people, 61% of the world's 6.1-billion people, live in Asia. By 2050, global population is expected to reach 9.3 billion, with that of Asia estimated at 5.3 billion. China, the most populous nation, is forecast to be home to 1.5 billion people. Stable supplies of food in Asia will thus be one of the major issues of the 21st century. Agriculture dependant on the use of large amounts of pesticides and chemical fertilizers to increase production not only has adverse effects on human health, but destroys the very soil and environment that are the foundation of that production.

This project is to develop biofertilizers and to promote their use in Asia. Biofertilizers comprise useful microorganisms, including rhizobia, which co-exist with leguminous plants and fix nitrogen from the air, and mycorrhiza which help plants absorb phosphorus and other inorganic nutrients. Through the use of biofertilizers, allowing reduced use of chemical fertilizers, the growth of sustainable, environmentally friendly agriculture can be expected.

In this project, useful microorganisms will be investigated and suitable carriers (charcoal and/or soil) and methods of fertilization will be developed and improved. The goal is to facilitate the wide-spread use of biofertilizers by farmers, the actual end-users, through research on effects on crop production and through technological exchange activities. In developing biofertilizers, their performance in helping crops absorb nutrients will be studied using isotopes (including nitrogen 15 and 13, and phosphorus 13) as tracers. Nuclear science and technology will also be employed in the sterilization of carriers

Soybeans forming rhizobia (right) and those without rhizobia (left)

using gamma rays and other radiation (resulting in less physical and chemical changes than heat sterilization).

This is a five-year project, starting in JFY2002. In JFY2002, useful microorganisms will be screened; in JFY2003, suitable carriers and methods of sterilization will be studied; in JFY2004, the screened microorganisms will be improved; in JFY2005, field experiments at pilot farms will be conducted; and in the last year, JFY2006, economic efficiency (cost) will be evaluated.

Low-Energy Electron Accelerator Project

Although low-energy electron beams (EBE≦300keV) are largely limited to use in surface treatments, they are characterized by high-dose rates (＞1000 times those of γ-rays), a high degree of safety (emission is stopped when the power is off), and low cost. They are widely utilized in industry, including for wiring and cables, foam, heat shrinkable tubes, radial tires, curing, flue gas and wastewater treatment, and sterilization.

The purpose of the project is to develop an electron accelerator with higher power density and simpler operation than a gamma irradiation facility using Co-60 . More specifically, it aims to develop a multi-purpose self-shielded low-energy electron accelerator requiring an initial investment much lower than a Co-60 facility, and to demonstrate applications contributing to industrial promotion and environmental preservation in Asian countries.

Test Plant of System with Low Energy EB

The project encompasses liquid, solid and gas irradiation, and, depending on the needs of each country, they will join in research and development of applications on vulcanization of latex, degradation of natural polymers, waste water, sterilization of spices, cosmetics and pharmaceuticals, granules/powders, films/sheets, production of hydro-gel dressings, and flue gases and dioxin.

This is a five-year program running through JFY2005. Based on agreement at the Workshop in January, 2002, main subjects will be liquids in JFY2002, thin films in JFY2003, and granules in JFY2004. A demonstration test of the EB system will be planned.

Topics of Existing Projects

Survey on Awareness of Radiation among High-School Students in Asian Countries

Radiation and radioisotopes are utilized in various fields, but their peaceful use is actually not well known. The Project on Public Information on Nuclear Energy conducted a survey by questionnaire of high-school students in eight FNCA countries – China, Indonesia, Korea, Malaysia, the Philippines, Thailand, Vietnam and Japan – and reported findings at the 2002 Project Leaders' Meeting of the project held on October 15 and 16, in Malaysia. Questions in the survey covered interest in radiation, recognition levels, images, knowledge of radiation use, and also knowledge of science and technology. The figure shows a question asking about the symbol for food irradiation.

Example of the Question

Which logo is internationally used to indicate that food was treated by radiation? Please select one among the four logos.

① ② ③ ④

Mutation Breeding of Sorghum and Soybeans Resistant to Drought

Hopes are high in Asian countries, in order to ensure future sources of food, for mutation breeding of sorghum and soybeans, both major drought-resistance crops. In that light, the FNCA Mutation Breeding Project began a multilateral research program focused on drought-tolerance in sorghum and soybeans in JFY2002.

Soybeans are good sources of plant protein as well as industrial materials, and sorghum is a promising food source for Asia in the future. The program aims at developing new varieties with superior drought tolerance, which could be grown in soil not suitable for cultivation now, such as difficult to irrigate areas in the mountains or coastal regions.

This is a five-year program starting in JFY2002. Soybeans are being studied jointly by the Philippines and Vietnam, and sorghum, by China and Indonesia. The participating countries have already exchanged promising seeds, and, using those, mutation breeding will be carried out. New varieties eventually produced will be shared.

Schedule of FNCA Workshops (WSs) and Meetings in FY2002

WS/Meeting (Project/Field)	Date & Venue	Outline of Activities
FNCA Meeting	Oct. 30-31 (Korea)	Exchange of views on policy issues toward enhancing regional cooperation on the peaceful utilization of nuclear science & technology, with the participation of ministerial level delegates from FNCA countries
FNCA Coordinators Meeting	March, 2003 (Japan)	Review of performance of existing FNCA projects and discussion of future plans, including new project initiatives, project terminations, and a direction for projects
Tc-99m Generator WS (Research Reactor)	January, 2003 (China)	Development of Tc-99m generators, indispensable for nuclear medical diagnosis, with Poly Zirconium Compounds (PZC) as adsorbents
Neutron Activation Analysis (NAA) WS (Research Reactor)		Development of standard software for NAA; "K_0-Method" for analysis of airborne particulate matter (PM)
Neutron Scattering (NS) WS (Research Reactor)	– (no plan in 2002)	Establishment of analytical techniques for identifying structures of natural- & synthesized polymer compounds
Mutation Breeding WS (Agriculture)	Aug. 22 - 23 (China)	Information exchange on the theme of "Reproductive Patterns," and establishment of Mutation Breeding (MB) Database, MB Manual, Mutant Stock Repository as sub-projects
Biofertilizer WS (Agriculture)		Development of biofertilizers using rhizobia, mycorhiza, associative nitrogen fixing bacteria, and phosphate solubilizing microorganisms developed with nuclear techniques
Project Formulation Meeting for MRP(2) (Agriculture)	Aug. 26 - 27 (China)	Drawing up a working plan for the Multilateral Research Program (2), which aims to develop new varieties of orchids resistant to insects
Radiation Oncology WS (Medical Use)	Dec. 17 - 20 (Japan)	Joint clinical trials in eight Asian countries on Standardized Radiotherapy Protocol for Uterine Cervical Carcinoma and refinement of it
PL Meeting on Public Information of Nuclear Energy (Public Information)	Oct. 16 - 17 (Malaysia)	Joint surveys of high school students on radiation utilization, etc., and dispatch of speakers for events with PI purposes within FNCA countries through Regional Speakers Bureau (RSB)
Radioactive Waste Management WS (Radioactive Waste Management)	Nov. 18 - 22 (Korea)	Exchange of information and experience, publication of "Consolidated Report" covering all data on radioactive waste management in FNCA countries
Task-Group Meeting on Spent Radiation Sources (SRS) (Radioactive Waste Management)	Aug. 12 - 16 (Indonesia) Aug. 26 - 30 (Korea)	Exchange of information and experience on safe management of spent radiation sources
Nuclear Safety Culture WS (Nuclear Safety Culture)	undecided (Vietnam)	Discussion of the work-plan in future and first implementation of peer-review for the safety of research reactors
Human-Resource Development WS (Human-Resource Development)	Oct. 8 - 10 (The Philippines)	Discussion and information exchange on investigation of basic data on human-resource development in FNCA countries and E-learning systems using the internet
Low-Energy Electron Accelerator WS (Industry)	Dec. 16 - 20 (Japan)	Promotion of industrial deployment of low-energy electron accelerators in FNCA countries

Survey of Basic Data on HRD in the Nuclear Field

Based on agreement at the Third FNCA Coordinators Meeting held in March, 2002, a Survey of Basic Data on Human Resources Development (HRD) in the Nuclear Field is now under way.

The survey aims to produce quantitative data on HRD in the nuclear field that can be used to develop HRD plans in FNCA member countries. It asks about such things as the number of government administrative and technical officials and researchers; the number of teachers and students at universities; the number of applicants passing national certification examinations; and number of nuclear training courses and trainees.

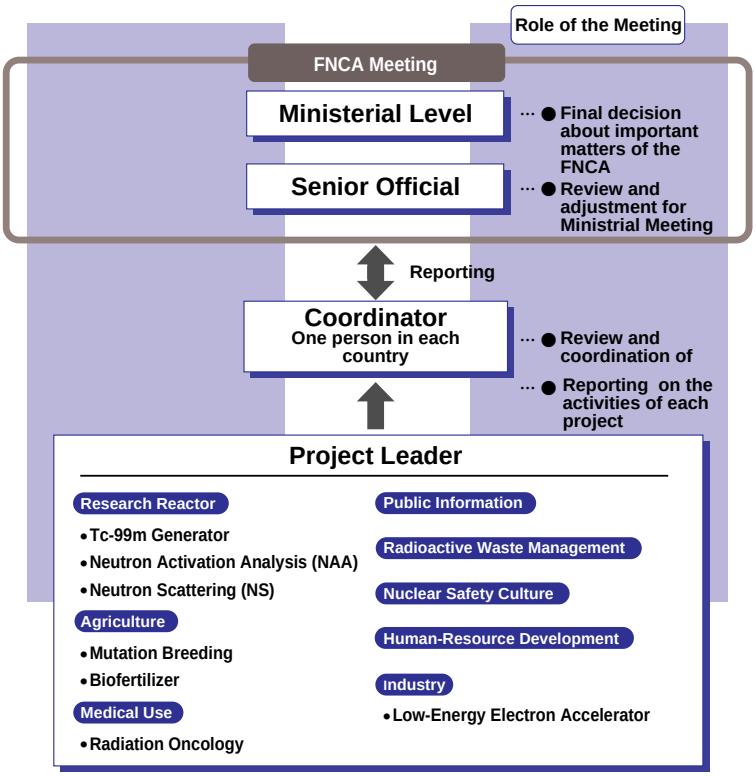
The survey will continue until JFY 2004 (three years), and its findings are to be used 1) to determine through comparisons the actual situation in each FNCA country so as to aid in drafting HRD plans, 2) to formulate the scope of an HRD project of common interest to the FNCA countries, and 3) to review the Nuclear Researchers Exchange Program and Nuclear Training Courses offered by Japan.

What is the FNCA?

The Asian region enjoys one of the highest economic growth rates in the world. To sustain such growth in the face of limited resources and the need to protect and preserve the environment, the region can benefit from effective utilization of nuclear science and technology.

The Forum for Nuclear Cooperation (FNCA), consisting of nine Asian countries – Australia, China, Indonesia, Korea, Malaysia, the Philippines, Thailand, Vietnam and Japan – is an effective mechanism for enhancing socio-economic development through active regional partnerships in the peaceful and safe utilization of nuclear science and technology.

The FNCA Framework



POSTSCRIPT

FNCA Projects Are Driven by Needs of Society

-- Ministers discuss on sustainable development --

Dr. S. Machi
FNCA Coordinator of Japan
Senior Managing Director,
Japan Atomic Industrial Forum (JAIF)

"The World Summit on Sustainable Development 2002" declared the reduction of poverty.

There are 1.3 billion people barely surviving at US$1.00 per day. Eight hundred million people are suffering chronic malnutrition. In order to secure foods for enormously increased global population, more productive and sustainable agriculture should be attained.

Drinking water is lifeline. More than 1 billion people are not able to access safe and clean drinking water. Health is essential condition for comfortable life of people. These basic human needs can be met by nuclear techniques in combination with other techniques.

The FNCA projects for sustainable agriculture are promoting the "biofertilizer" and "mutation breeding". Both are expected to achieve better production of important crops at stressed conditions.

Nuclear energy contributes sustainable development

Nuclear power is GHG (Green House Gas) free energy resource and economically competitive with fossil fuels which emit large volume of GHG. In order to decrease GHG emission to comply the Kyoto protocol, increasing the nuclear power in energy mix is indispensable.

The FNCA had already two expert meetings to exchange views on the plan and strategy of energy demand and supply. These experts have strongly suggested the initiation of the project on "Nuclear energy and sustainable development". The FNCA countries are facing the problems of rapid increase of energy demand and problem of limited reserve of oil and gas.

Nuclear power is much more economical than solar and wind energy and therefore, in my view, the nuclear power should be in Clean Development Mechanism (CDM).

(Editor in Chief)

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