FNCA Newsletter

Forum for Nuclear Cooperation in Asia

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Growing FNCA Responds to Human Needs with Partnership

Sueo Machi
FNCA Coordinator of Japan
Commissioner, AEC of Japan

Since the 1st Ministerial Meeting of FNCA in Bangkok in 2000 which declared the vision of FNCA to achieve socio-economic development by nuclear technology, 11 Projects have been efficiently implemented in order to reach tangible outcomes.

The FNCA activities meet the basic human need such as food supply and health care. Radiation therapy is a successful FNCA project to better save lives from uterine cervix cancer which has high incidence in Asian countries. New variety of sorghum more tolerant against drought was developed by the joint research of China and Indonesia in FNCA umbrella. This variety may enhance the production of sorghum, which is important staple food.

At the 5th Ministerial Meeting in Hanoi, the most important topic of human resource development strategy was taken up. The chairman of Viet Nam Atomic Energy Commission proposed to set up the Asia Nuclear University for education, training and research using a network of FNCA country's respective expertise.

There is no doubt that well trained and educated workforce is fundamental to the development of nuclear science and applications. This proposal will be fully reviewed by high level representatives of the member countries to reach a recommendations to be reported to the next Ministerial Meeting.

To prepare energy supply strategy to meet rapidly growing need in the East Asia is an important challenge. The FNCA has started in 2004 the new joint activity to discuss on the medium and long-term energy demand and supply policy. Nuclear power is obviously an interesting energy not emitting GHG(green house gases) and saving limited fossil fuel reserve.

Industrial development is a key to reduce poverty. Nuclear technology such as electron accelerator application has large potential as industrial processing tool. The FNCA project on the electron beam application is focusing on converting natural polymers to value added products using accelerators. This project will step forward to the market survey and demonstration of pre-commercial production.

The partnership and commitment of the member countries will continue to drive FNCA activities aiming to achieve the agreed goal. I also would trust and appreciate tireless efforts of experts, scientists, engineers, project leaders, coordinators for remarkable outcome of FNCA activities leading socio-economic benefits.


Dr. S.Machi was interviewed by Viet Nam Television

Field	Projects	Highlight	Workshop
Human Resources Development		Review of human resources development strategy.	2004/10 Malaysia
Application for Agriculture	Mutation Breeding	Drought tolerant sorghum and soybean, Insect resistance on orchid, Disease resistance in banana.	2004/08 Indonesia
	Biofertilizer	Improvement of soil microbial activities, field demonstration, the promotion of farmer's use, career sterilization by irradiation.	2005/01 Viet Nam
Application for Medical Care	Radiation Oncology	Clinical test of chemo-radiotherapy for cervix cancer was started. Protocol of chemo-radiotherapy for nasoparyngeal cancer is designed.	2004/12 Thailand
	Cyclotron and PET in Medicine	New Project of PET application for medical diagnosis from 2005. Work plan was designed.	–
Public Information		Seminar on training of nuclear communicators Regional speakers bureau.	2004/10 Thailand
Radioactive Waste Management		TENORM:Task Group visited China and Thailand.	2004/09 Malaysia
Research Reactors Utilization	Neutron Activation Analysis	Introducing IAEA-k_0 software to FNCA member countries for measurement of airborne particulates.	2005/01 Thailand
	Tc-99m Generator	The quality test of Tc-99m eluted from the PZC-based generator.	
	Research Reactor Technology	Work plan of the new project on "Research Reactor Technology for Effective Utilization" was prepared.	
Nuclear Safety Culture		Pear review of research reactor: isssues of DNRR in Vet Nam and HANARO in Korea.	–
Industrial Application	Low Energy Electron Accelerator	Status of utilization of electron accelerator for flue gas treatment in the FNCA participating countries.	2004/09 China
Panel on "Role of Nuclear Energy for Sustainable Development in Asia"		The first meeting in Tokyo Agreement on the cooperation for regional energy and environmental issues.	2004/10 Japan

World Heritage in FNCA Countries

Japan

Atomic Bomb Dome in Hiroshima Peace Park

"Atomic-bomb rescue and relief report, 1945.Oct." Dr. T. Nagai of Nagasaki Univ.

"Everything was finished. Our mother land was defeated. Our university had collapsed and classrooms were reduced to ashes. We, one by one, were wounded and fell. The houses we lived in were burned down, the clothes we wore were blown up, and our families were either dead or injured. What are we going to say? We only wish to never repeat this tragedy with the human race.

We should utilize the principle of the atomic bomb. Go forward in the research of atomic energy contributing to the progress of civilization. A misfortune will then be transformed to good fortune. The world civilization will change with the utilization of atomic energy. If a new and fortunate world can be made, the souls of so many victims will rest in peace."

Human Resources Development

Base for Nuclear Science and Technology

Human Resources Development (HRD) is an essential base for the sustainable development of nuclear science and technology. Each country should have its own HRD strategy primarily based on its national nuclear development program. Meanwhile, it is useful for all countries to tackle common needs and issues in HRD jointly under a regional cooperation framework like the FNCA.

From this viewpoint, the HRD project was started in 1999. It aims to promote mutual cooperation in HRD and to strengthen the foundation for nuclear applications in each country. The HRD team has carried out various activities such as exchanging training materials, conducting a survey on existing nuclear human resources, discussing the HRD strategy model in accordance with the stage of development in each country.

Workshop in Oct., 2004, in Kuala Lumpur

This was the first time the HRD history of each country was reviewed and HRD strategy modeling discussed.

Japanese and Korean participants illustrated their long history covering various phases:

a. Start of nuclear developments 1960s
b. Introduction of nuclear power around 1970s
c. Large-scale plant development and localization

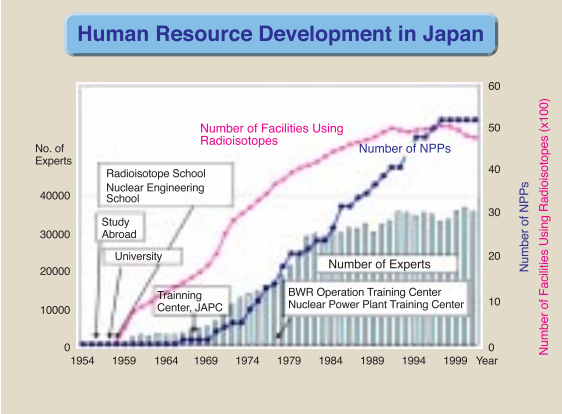
As for the strategy model, participant countries were divided into three groups by nuclear development stage:

a. Three countries (China, Korea and Japan) who are operating nuclear power plants (NPPs),
b. Two (Indonesia and Viet Nam) planning to build NPPs,
c. Three (Malaysia, Thailand, and the Philippines) focusing on radiation and radioisotope applications.

This activity will be upgraded to case studies on specific themes in the future.

It was also agreed during the seminar that closer linkages with other HRD networks, like IAEA/ RCA and the ANENT, should be developed, in order to enhance synergetic effects.

It was recognized that HRD is an important subject by the senior officials and ministers in FNCA countries.



Review of HRD for Nuclear Energy Development in Japan

Ministerial Level Meeting in Dec., 2004 in Hanoi

At the Round Table discussion on HRD, a new concept – "Asian Nuclear University" – was proposed by the Viet Nam. It is likely that the HRD project will study this idea as a future activity.

World Heritage in FNCA Countries

Thailand

Historic City of Ayutthaya and Associated Historic Towns

Viet Nam

Complex of Hue Monuments

Application for Agriculture

The portion of the population engaged in agriculture in Asia is very high. Improving agricultural productivity is crucial to the development and welfare of Asian countries.

We are developing two projects: Mutation Breeding and Biofertilizers.

Mutation Breeding (MB) by irradiation is a powerful tool for food security and environment preservation. Mutant varieties with drought tolerance, insect resistance, disease resistance have been requested by participant countries.

Biofertilizer can increase the crop yields and reduce the use of chemical fertilizers by using the environmentally friendly functions of microorganisms, such as nitrogen fixing.

Demonstrations of Biofertilizer (BF) effectiveness are required in order to promote them to farmers.

Mutation Breeding

Following projects are under developing.

- Drought Tolerant Sorghum and Soybeans : 2002-2005
- Insect Resistant Orchids : 2003-2007
- Disease Resistant Bananas : 2004-2008

Sorghum (China and Indonesia)

"Zhengzhu" from China was selected as the common research mutant. Optimal dose has been found and selection of drought tolerant mutants will be continued. A sweet sorghum mutant with drought tolerance, "Yuantian No.1," was produced in China.

Soybeans (Indonesia, Malaysia, Philippines and Viet Nam)

Promising mutant lines with drought tolerance or high yield to survive in marginal land have been identified in participating countries.

Left: Promising soybean mutant. Right: Local soybean, by Agricultural Genetics Institute, Viet Nam

Orchid (Indonesia, Malaysia and Thailand)

Selection techniques for insects have been developed. Dendrobium Sonia "Red 17" (photo by Kasetsert University, Thailand) was selected as the common clone for the project and acute split doses for mutagenesis will be used.

Banana (Indonesia, Philippines, Malaysia and Viet Nam)

Participating countries have screened the mutants for disease resistance. Though for targated diseases are different in participating countries, sharing experiences is beneficial.

Photo by University of the Philippines at Los Baos

2004 Workshop

The workshop was held in Indonesia in August, welcomed there by the Minister of Agriculture.

The main theme was reproductive techniques for mutants: "Techniques on Reproductive Pattern in Clonally Propagated

Crops".

Some countries have gamma irradiation facilities for large plants in the field, small plants in a greenhouse, and small seeds in room.

IRB (Institute for Radiation Breeding, Japan) offered the use of Gamma Field.

The use of Gamma Room at Kasetsert University in Thailand and Gamma Greenhouse of MINT in Malaysia (September, 2005 open) were encouraged.

Efforts are proceeding well through strong connection and cooperation among members countries.

Participants got the opportunity to visit the Center for Forest Biotechnology and the Improvement Research and Development, and the Salaka (snake fruit) plantation, with the great assistance of BATAN, Indonesia.

Open Lecture on Mutation Breeding

The lecture was given during the Workshop, Sep. 2, at UPN Veteran University, and was attended by more than 60 students and faculty members. Three speakers, from Indonesia, Malaysia and Japan, presented basic information on mutation breeding and high-level applications of technology.

After the lecture, one university student commented that it was a great opportunity to learn that nuclear technology has contributed not only to power generation but also to agricultural.

Seeking Activities for Future

From FNCA member Indonesia, Dr. Soerant of BATAN (photo, middle) visited a sorghum field at Shinsyu University in Nagano Prefecture, Japan, in October. He is a specialist in the drought tolerance of sorghum. Dr. Nakagawa, director of IRB (photo, left) guided him around the Perpetual Livestock Station and sorghum fields and facilities, and the two shared their experiences.

They also visited JAERI-Takasaki where they were shown around the ion beam facilities by Dr. Tanaka. In the past few years, ion beam technology has attracted a lot of attention in member countries for its potential of mutation breeding.

Publication of Mutation Breeding Manual

Publication of the manual was proposed in 1993 in order to enhance mutation breeding technology in Asian countries.

A meeting for final editing of the manual was held on June 11-12 in Tokyo, with the editors, Dr. Medina III, PNRI, and Dr. Amano, Fukui Pref. Univ., and Dr. Tano, Project Leader of Japan. The manual is available on the FNCA website.

http:// www.fnca.jp/english/index.html

http://www.fnca.jp/english/mb/mbm/e_mbm.html

Database

The Mutation Breeding Database was revised with the cooperation of member countries in Aug. It includes information on more than 120 institutions and persons, and is available on the FNCA web site.

http://www.fnca.jp/english/mb/mbdb/db/e_database.html

Workshop on Orchids

This Workshop was planned and organized by Kasetsert University in Thailand and held in Dec. in Bangkok, with the participation of two scientists from Malaysia and one from Thailand. It included a laboratory demonstration. Participants also had the opportunity to visit many scientific locations, such as the Department of Entomology, KU, Orchid Garden, Gamma Irradiation Service and Nuclear Technology Research Center, commercial producers of orchids, and so on, and learned the current state of orchid cultivation in Thailand.

Biofertilizer

Each country is developing biofertilizers which use following functions of microorganisms.

- Nitrogen-fixing
- Silicate, P- and K-solubilizing
- Root-pathogen-antagonist
- Plant-growth-promoting

The interaction between microbial activity and soil condition should be complementary. Changes in soil pH and carbon and nitrogen content can increase the activity of microor-

ganisms and the application of bio-fertilizers can improve soil condition.

Sterilization of the carrier by irradiation or heat for biofertilizers is important to the long survival and effectiveness of the bacterium.

This Year's Activities

Rhizobium bacteria and Mycorrhiza are major theme of target microorganism.

This year's focus is the following.

Field Demonstration

Each country has performed a field demonstration and concluded that BF could supplement some chemical fertilizers.

Promotion of Use by Farmers

The Philippines staged a promotional festival – "Farmer's Field Day" at the silking stage of corn with researchers, extension workers, government and non-government organizations (NGO's), and most especially farmers.

It would be more successful if promoted by both the government and the company selling the BF product, with proper quality control.

Carrier Sterilization by Irradiation

Sterilization has been done using 25-50kGy irradiation doses by China, Indonesia, Malaysia, Thai and Viet Nam, with good results.

There is a need to study effective sterilization doses for many kinds of BF carriers. FNCA coordinators are requested to facilitate between the Irradiation Institutes and Agriculture Organization.

Gamma Irradiation Equipment In China

Biofertilizer Manual

Japanese group presented their part of manual as the first version. This manual will be completed by sharing works.

- Chief editor: Viet Nam
- General methodology: Japan
- Quality control: Korea and Viet Nam
- Rhizobia: Viet Nam
- Mycorrhiza: Malaysia and Thailand
- Associative nitrogen fixing bacteria: China, the Philippines and Indonesia

Workshop

The workshop was held in Hanoi, Viet Nam, Jan 24 – 28, 2005. The local organizer was the Institute for Nuclear Science and Technology (INST), Vietnam Agricultural Science Institute (VASI). Dr. Vuong Huu Tan, chairman of VAEC, and Dr. Vo Van Thuan, director of INST/VAEC, gave opening remarks and welcomed the participants. Dr. Tadashi Yokoyama, Project Leader of Japan, delivered an address on behalf of Japan.

Each country reported the status of BF research and the progress of field demonstrations. <<<the importance of surviving methods of effective bacterium.

Biofertilizer production line in China

Tomato (right side) showed good extension with inoculation of phosphate solubilizers (Korea)

Farmer's Field Day in the Philippines

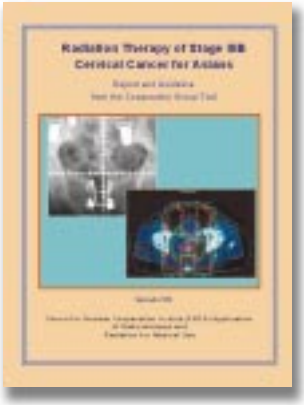
Manufacturing of BF in Viet Nam

Application for Medical Care

Radiation Oncology

Survive a bout with cancer

The object of this project is to improve radiation treatment techniques for Asian patients through creation of a standard protocol. The Standardized Radiotherapy Protocol was established by joint clinical studies. This study, cases of advanced uterine cervix cancer, achieved a 5-year overall survival rate of 53%, the same level as in developed countries. (CERVIX-I)



This standard protocol was published as "Radiation Therapy of Stage IIIB Cervical Cancer for Asians: Report and Guideline from the Cooperative Trials" in September 2001. This guidebook is now actively used for dissemination of the protocol in FNCA countries.

It has been used in training courses by the International Atomic Energy Agency (IAEA) and has increased synergy between activities of FNCA and IAEA.

2004 Workshop in Thailand

- The protocol for accelerated hyper fractionation RT (AHF) for uterine cervix cancer, CERVIX-II, was designed and implemented. It has indicated a 4-year overall survival rate of 77%, which is an improvement from CERVIX-I.
- A new clinical trial protocol for chemo-radiotherapy (chemo-RT) for advanced uterine cervix cancer, CERVIX-III, was designed and initiated.
- A pilot study for chemo-RT for nasopharyngeal cancer (NPC) has been finished. The results will be used to design protocol of clinical test for NPC.
- The importance of QA & QC in radiation therapy was emphasized through the visits of medical physicists (from China, Japan, Korea, the Philippines and Thailand) to institutions in two participating countries (Korea and Japan) for dosimetry inter-comparison.

Highlights of Activities

Advanced cancers are poorly controlled locally, and often develop distant metastases despite local control. Several clinical trials of chemo-radiotherapy have been done in Europe and America to improve the treatment outcomes of locally advanced cervical cancers.

FNCA trials follow upon those. NPC, which is one of the most common cancers in Asia, has been identified as the next target disease. Two new trials of chemo-radiotherapy, for cervical cancer and NPC, will be initiated.

World Heritage in FNCA Countries

Uluru-Kata Tjuta National Park

The Great Wall

Public Information

For Better Public Understanding

Public Information (PI) activities are indispensable in enhancing the public's understanding of the utilization of nuclear science and technology.

FNCA activities of PI project have been carried out mainly on information exchange for about ten years, since 1991 .

FNCA 2004 Project Leaders Meeting

This meeting was held in Oct., in Bangkok, Thailand, hosted by the Ministry of Science and Technology (MOST) of Thailand.

A "Seminar on Training of Nuclear Communicators" and a "Seminar on Application of Nuclear Power: Energy and Environmental Issues" (Oct. 28) were held.

Highlights of the PL Meeting

Current status of nuclear PI was reported and discussed. Highlights are as follows.

(1) Summary evaluation of the joint cross-national survey of high school students;
(2) Evaluation of FNCA PI project activities for the period 2002-2004;
(3) Communications with the mass media;
(4) Training of nuclear communicators;

Seminar on Training of Nuclear Communicators

The joint cross-national survey of high school students, students obtain information mainly from mass media. It is therefore important to communicate with people in the media.

Japanese member Mr. Minoru Kubo of the Japan Nuclear Cycle Development Institute (JNC) made two presentations entitled "Better Communication" and "Television Interview". He also conducted a simulation/practice on how to handle a press conference and a television interview by using actual TV camera equipment and a monitoring system (photo). Two mock press conferences were conducted under realistic conditions.

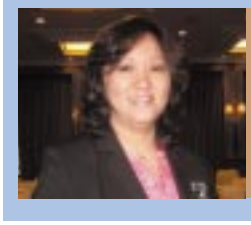
Regional community of PI

A specific objective of the Speakers Bureau (RSB) is to support FNCA countries by sending appropriate persons to symposiums, seminars, and discussion meetings as envited speaker's upon request.

FNCA PI Project Leaders from the Philippines and Viet Nam accepted an invitation to the WIN (Women In Nuclear)-Global Annual Meeting that was held in Japan on May 17-22, 2004. They gave presentations on the state of PI activities in their countries.

Impressions of Ms. Rhodra R. Leonin (PI Project Leader of the Philippines)

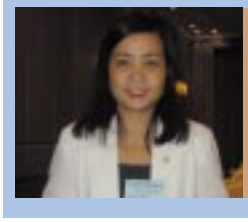
The WIN-Global Annual Meeting was indeed a very good venue for learning new/updated and additional information on the status/applications of nuclear energy in other countries. It was also an excellent opportunity to establish linkages with the participants and to gain insights into the increasing participation of women in the nuclear field, especially in promoting nuclear energy to the public.



Ms. Rhodra R. Leonin (PI Project Leader of The Philippines)

Impressions of Ms. Dang Thi Hong (PI Project Leader of Viet Nam)

This was a good chance to acquaint all WIN-Global members with the FNCA Organization and the achievements of FNCA projects in Viet Nam. This meeting was a valuable opportunity for me to learn about PI activities in other countries in the world. It will be useful for me in carrying out PI activities in Viet Nam.



Ms. Dang Thi Hong
(PI Project Leader of Viet Nam)

PI Web Topics News

We started the "PI Web Topics News" in the fall of 2004. We would like to distribute news on the website, available at all times, with the cooperation of the PL in each FNCA country.

http://www.fnca.jp/english/pi/topicsnews/index.html

Radioactive Waste Management

The "Safety Environment" in Asia

This project is assessing topical issues related to radioactive waste management including technical problems, safety control, safety assessment, and issues relating to laws and regulations. These studies are related to international commitments and waste-related treaties and are targeted at establishing nuclear safety cultures on radioactive waste in FNCA countries through complying with the basic rules of radioactive waste management.

2004 Workshop

FNCA 2004 Workshop on Radioactive Waste Management was held in Kuala Lumpur, Malaysia for the period of 27 September to 1 October 2004.

Topical issues are as follows;

Country Report (Current Status of RWM in each country)

: It was interesting to note on the variety of Issues raised by the participants ranging from regulations/legislation, waste inventory as well as technologies involved as means to control radioactive waste. Establishment of repository for disposal of radioactive waste presented the most complex issue for the majority of the countries.

Project Evaluation

: Participants of the workshop have unanimously agreed that the project has provided a useful platform among others, for promoting safe management of radioactive waste, exchanging experiences and information, creating awareness among member countries and equally maintaining cooperation.

Sub-Meetings

: The participants discussed issues of Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) as raised by several member countries. Again, the issue revolved from the legal and technical stand points. The themes for the session were "Regulatory aspects on NORM /TENORM", "Waste Treatment & Characterization", "Siting Activities and Safety Assessment for Disposal of LILW" etc.

Technical Visits

: Visit to mineral processing company where natural radioactive elements namely uranium and thorium are treated, and short visit of the new office of AELB where the participants were briefed on the activities of the Board. Then the participants visited MINT and had opportunity to glance the storage facility for oil sludge.

Roundtable Discussions

: Roundtable discussions on Interim reporting of TENORM Task Group, and RWM three-year work plan were held. It was agreed to publish the activity report of the task by the end of March 2005, and it was agreed that the 2005 Workshop would be held in Japan.

The participants also agreed establishment of new task group on decommissioning/clearance. It will be endorsed after approval by FNCA Coordinators Meeting to be held in March 2005.

Highlight of 2004

TENORM Task Group meeting were held at China from August 2 to 6, 2004, and in Thailand from Aug. 23 to 27, 2004.

A Japanese expert team conducted a discussion of TENORM problems. Recent activities related to NORM & TENORM management in IAEA and ICRP were introduced.

And it was presented that in the Japanese discussions, the direct application of the Basic Safety standard exemption level to NORM is not appropriate and it is better to use the intervention exemption concept, which was introduced in ICRP publ.82.

The task group's activities over two years will be compiled and published by the end of March 2005.

Pile of Monazite sand at a mineral processing country: taken at technical visit during the 2004 RWM Workshop.

Radiation dose measurement in Thailand: The radiation level can at times exceed the regulation of safety standard

Research Reactor Utilization

Neutron Activation Analysis

Analysis of Environmental Pollution

The object of this project is analysis of environmental pollution in Asia by Neutron Activation Analysis (NAA).

This project has been carried out as following.

- Conducting regular measurements of air borne particulate matter (PM) with Neutron Activation Analysis (NAA)
- Comparisons of the measured data among participating countries
- Standardizing NAA for the FNCA countries.

Workshop, 2004, in Bangkok, Thailand

The workshop was held from January 17 to January 21, 2005, at OAP, Thailand.

It was divided into five sections: (1) reports on air particulate samples, (2) progress of the project activities, (3) discussion on action items, (4) discussion on marine samples, and (5) evaluation of the project. Every participant had a worthwhile experience in the workshop.

Sub-Workshop for IAEA-k_0 Method

A sub-workshop on IAEA-k_0 took place from January 13 to January 15 at OAP, Thailand. This sub-workshop was planned to introduce IAEA-k_0 software to FNCA member countries. An expert on IAEA-k_0 software (Dr. Menno Blaauw, Technical University of Delft, Netherlands) was sent from IAEA on this occasion. A total of twelve participants from seven countries took part.

Tc-99m Generator

For Inexpensive Medical Care, Readily Available

Tc-99m is an essential radioisotope for diagnosis in nuclear medicine, and currently most Asian countries rely on supplies from overseas, which are both expensive and not always stable. As the technology for producing Tc-99m involves the nuclear fission reaction, the generation of high level radioactive waste is unavoidable.

This project promotes technology for producing Tc-99m using a poly-zirconium compound (PZC) as an adsorbent for enrichment of neutron activated (n, γ) Mo-99.

Greater certainty of supply would yield social benefits in terms of effective medical diagnosis, and local production would give conserve foreign-exchange resources. In the long run, this project could result in a regional Tc-99m supply network among the FNCA countries.

The 2004 Workshop in Bangkok

One delegate from each of China, Indonesia, Korea, Malaysia, the Philippines and Thailand, two delegates from Japan, and nine experts from Thailand participated.

A Summary Report of the Tc-99m Generator Group was presented by Dr. T. Genka (center).

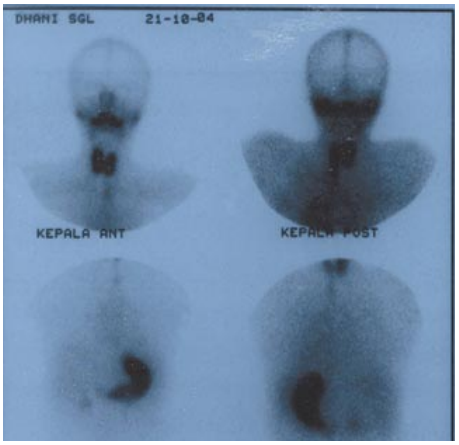
The highlight of the present workshop was the quality test of Tc-99m eluted from the PZC-based generator by means of labeling. Prior to the workshop, experiments on labeling efficiency for technetium radiopharmaceutical kit were requested of each laboratory. The labeling results were evaluated together with the results of chemical purity measurements, both of which were fairly good.

A work plan for FY2005 was discussed and agreed to as follows.

1) Distribution of PZC material

2) Clinical trials in hospitals

3) Commercial production and supply of PZC-based Tc-99m generators
4) Improvement of computerized loading machines
5) Publication of comprehensive report on PZC-based Tc-99m generator



The first gamma-camera images of Tc-99m obtained from PZC based generator (Courtesy; Dr. A. Mutalib, BATAN)

Entering the stage of practical application; Clinical trials in Indonesia

Clinical trials in hospitals have gone on in Indonesia. The first trial using Tc-99m eluted from the newly developed generator was successfully carried out on 21 October 2004 at Hasan Sadikin Hospital in Bandung, followed by two more trials until January 2005. Another 15 trials are planned at hospitals in Bandung and Jakarta within 2005.

The first gamma-camera images of Tc-99m obtained from PZC based generator (Courtesy of Dr. A. Mutalib, BATAN)

Message from Dr. K. Tatenuma, the developer of PZC material

It was in 1995 that my company first started research and development of a new molybdenum adsorbent, cooperation with JAERI. After a hard, difficult time, we began a collaborative research with BATAN Indonesia to make a marked advance in 2000. Then I met Dr. S. Machi, who had just returned from the IAEA. He convinced of the potential of PZC technology and led us to the FNCA project, where there was an arena of experts in Tc-99m generator technology covering fission-type and gel-type generators. Supported and aided by the participants from the FNCA countries, my dream as a scientist has grown day by day, year by year – to realize a level of nuclear medicine that offers early diagnosis at low cost to benefit peoples of the region and, indeed, all over the world. (President of Kaken Co. Ltd.)

Reseach Reactor Technology

Sharing Codes Towards Common Safety and Effective Utilization

Utilization of common calculation codes would contribute to improving and equalizing the level of neutronics calculation among participating countries through discussions based on common tools towards the enhancement of safe operation and effective utilization of research reactors in the participating countries.

The formulation meeting for the new project took place within the workshop on the Utilization of Research Reactors from January 17 to January 21, 2005, at OAP, Thailand.

Formulation Meeting for the new project, 2004

The objectives of the meeting were to share information on the current status of research reactors among the participating countries and to determine specific activities of the new project on “Research Reactor Technology for Effective Utilization.” The concrete contents were discussed and determined as follows:

(1) Project Title

“Sharing Neutronics Calculation Techniques for Core Management and Utilization of Research Reactors”

(2) Objective

The objective is to share neutronics calculation techniques for core management of research reactors among the participating countries, in order to assure safe, stable operation and thus more effective utilization.

(3) Project Duration

The project duration will be three years, from Japanese FY2005 to FY2007.

Technical Visit

Technical visit to the OAP facilities of Research Reactor, Radioisotope Production, Food Irradiation and Mutation Breeding were organized during the Workshop.

Press Conference

Press conference was held after the opening ceremony. Reporters from two media stations (TV and Radio) attended and the report were broadcasted on the same day.

Nuclear Safety Culture

What is Safety Culture?

According to the IAEA, Nuclear Safety Culture (NSC) means the assembly of characteristics and attitudes in organizations and individuals to establish nuclear plant safety with the spirit of "Safety First."

NSC has the following major highlights:

(1) NSC involves not only good safety attitudes in people, but also good safety management by organizations.

(2) Good safety culture means giving the highest priority to safety.

Good NSC must be maintained by a constant assessment of the safety significance of events and issues, so that the appropriate level of attention can be given.

Establishing and Enhancing NSC in the FNCA

The FNCA NSC project aims to establish and enhance safety culture in nuclear applications. One of the most encouraging activities recently undertaken is the self assessment and peer review of research reactors. The review focuses on six major factor sets affecting safety culture.

Much improvement has been seen in fundamental aspects, e.g., safety policies and infrastructure, which in turn can improve safety practices.

Recent Activities

(1) Peer reviews of Safety Culture at research reactors

a) Viet Nam DNRR in JFY 2002 and follow-up at the Nuclear Safety Culture Workshop, and

b) Korea HANARO reactor KAERI in JFY 2003.

(2) The 2004 workshop was postponed because of unavoidable circumstances and, in lieu of that workshop, a bilateral meeting between Australia and Japan will take place in March 2005, to outline future strategic areas.

Next year's plan and future ideas will be discussed, considering perticipating countries' project evaluation.

World Heritage in FNCA Countries

Indonesia

Borobudur Temple compound

Korea

Haeinsa Temple Changgyong P'ango, the Depositories for the Tripitaka Koreana Woodblocks

Industrial Application

Low-Energy Electron Accelerator

Promotion of Electron Beam Utilization

The main objective of the project is to develop new technology using low energy electron beam (EB) irradiation systems, which have a variety of applications and good safety features, and to demonstrate their specific applications. A self-shielded low energy accelerator system needs an initial investment much lower than does a Co-60 facility. Its operation is simple and safe. The system can be applied in various fields such as radiation processing, environmental conservation, etc. This project was participated by eight FNCA countries.

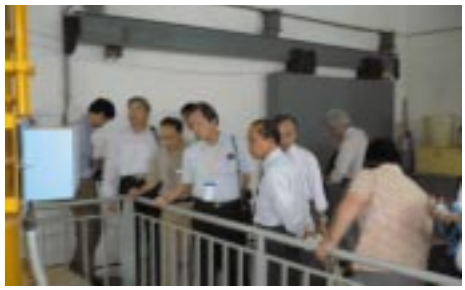
Workshop 2004

The Workshop on Application of Electron Accelerators was held 6-10 September, 2004, in Beijing, China. The main objective of the workshop was to discuss the state of utilization of electron accelerators for flue gas treatment in participating FNCA countries and to formulate future programs. The workshop was attended by 27 experts from the FNCA member countries – all except Australia.

On the first day, a National Executive Management Seminar on Applications of Electron Accelerators was held and attended by 67 participants from industries, universities and research institutes, and members of the FNCA Workshop.

Technical Visits

Workshop participants visited the China Institute of Atomic Energy (CIAE) and the Institute of Nuclear and New Energy Technology (INET), Tsinghua University.



All were very impressed with the work carried out at Tsinghua University on electron beam facilities for flue gas treatment, on reduction of electron beam dose, and on improvement in the collection of fertilizers by-products.

Work Plan for 2004--2005

Wastewater is a severe problem for FNCA member countries. Therefore, it was decided that the main topic would be EB treatment of wastewater, as follows, in FY2005.

- Demonstration test of EB system for wastewater
- Open lecture
- Evaluation of phase 1 project
- Program formulation of phase 2

All member countries are requested to conduct a preliminary survey on the potential need for EB treatment of water in their countries and report at the workshop.

World Heritage in FNCA Countries

Malaysia

Kinabalu National Park

The Philippines

Baroque Churches

Panel : Role of Nuclear Energy for Sustainable Development in Asia

Seeking Cooperation on Regional Energy and Environmental Issues

The first meeting of this Panel was held Oct. 20-22, 2004, in Tokyo, with the participation of decision-makers and experts in nuclear and energy fields. The participants were 17 delegates from 8 FNCA countries – China, Indonesia, Japan, Korea, Malaysia, the Philippines, Thailand and Viet Nam –and 41 observers from Japan. The delegates also visited nuclear facilities on Oct.23.

Background and Objectives

Asia is experiencing the most remarkable economic growth in the world, and energy demand is rising sharply. To discuss the regional energy and environmental issues, this Panel on the "Role of Nuclear Energy in Sustainable Development in Asia" was established this year as a new FNCA activity. The Panel reviews and evaluates nuclear energy in terms of stability of energy supply, environmental impact, and economic competitiveness, and formulates long-term energy supply-and-demand outlooks. In that context, questions in introducing nuclear power, such as assuring safety and dealing with radioactive waste, are also clarified.

The panel is to complete its three years of activities in FY2006 and present the outcomes as recommendations. The recommendations are expected to prompt individual countries to formulate energy and environmental policies and reflect in national policy, including revised reduction targets for greenhouse gas emissions for the next commitment period (2008-2012) under the Kyoto Protocol.

Summary of the Discussions

- Energy demand in the FNCA region will increase rapidly in the future, due to fast-paced socio-economic development.
- In the FNCA region, exploitable fossil fuel reserves are very limited. On a per-capita basis, they are by far the lowest in the world.
- The use of fossil fuels has been steadily rising to fuel global economic growth. In 2003, fossil fuels provided 88% of primary energy; nuclear provided 7% worldwide. Middle East oil dependency of some FNCA countries is increasing and leaves their economies more susceptible to supply disruptions.
- Global warming, mainly caused by CO_2 from the burning of fossil fuels, and pollution by SO_x and NO_x from the burning of coal are threats to the environment.
- National energy demand-supply strategies can be formulated in line with a policy on energy security. It is possible to enhance national energy security through international and regional cooperation.
- Long-term energy security is an important challenge because the reserves of fossil fuels are limited and energy demand is rapidly increasing in the FNCA region. Possible countermeasures are:
  - Further exploration for fossil fuels
  - Energy conservation and improving energy efficiency
  - Development of renewable energies
  - Diversification of energy sources
  - Increased use of nuclear power
- Approaches to reducing CO_2 emissions are:
  - Saving energy
  - Fuel switching
  - Increasing the use of renewable energies such as wind, solar and biomass.
- Nuclear power generation can play a key role in securing energy supplies and environmental protection. In this regard, more effort should be put toward enhancing public education and information diffusion, and improving public acceptance of nuclear power in light of safety assurance and risk-benefit.
- The 2nd Panel Meeting will be held in the autumn of 2005 in Japan. Representatives to the Panel from each country are requested to prepare for Agenda Item No. 3 described in the Work Plan.

Group picture of participants


Dr. S. Machi, FNCA Coordinator of Japan

New Project
Cyclotron and PET in medicine

Advanced medical technology-clinical PET

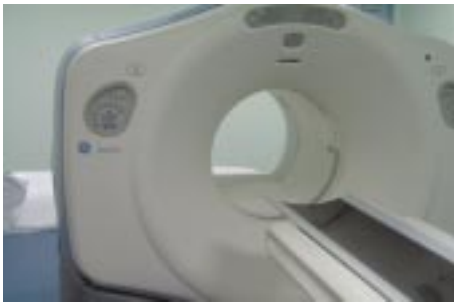
Early detection of diseases is very important for early treatment and also for reducing medical costs and social suffering. Nuclear medicine is making astonishingly rapid progress with the development of imaging technologies.

Positron Emission Tomography (PET) has emerged as a very important tool for diagnosis and staging/grading of diseases, evaluating the effect of treatments, detection of recurrence, and in the long-term follow up of cancer patients in many countries. In addition to oncology , PET has an important role in the field of neurology, cardiology and infections. With the elucidation of the molecular mechanisms of diseases, molecular imaging using PET systems will be useful for the development of new drugs and the diagnosis and treatment of various diseases.

However, PET is far from in daily clinical use because of the lack of experts, equipment and funds in many developing countries. It is expected that PET will be widely introduced into many more countries in the near future.

The New PET Project from FY2005

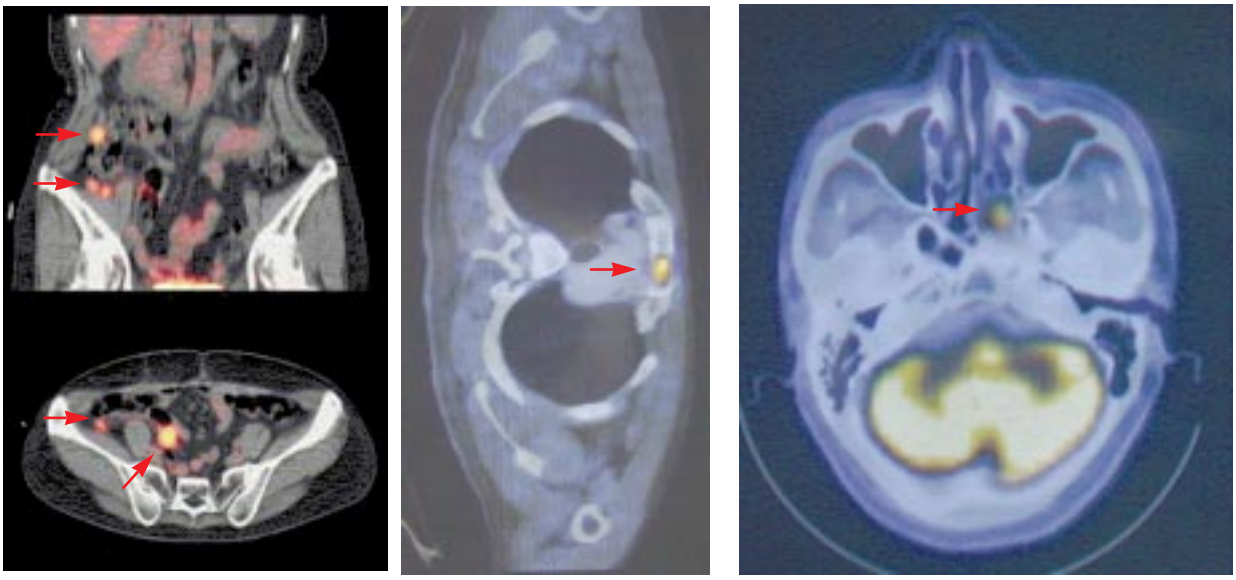
It is with the above facts taken into consideration and with regional cooperation in the FNCA spirit that Malaysia proposed a project, “Cyclotron and PET in medicine, and in Medicine,” at the 5th FNCA Coordinators Meeting in Tokyo.



Most Advanced PET-CT in Penang Hospital, Malaysia

The meeting endorsed the proposal, and the project is scheduled to start in FY 2005. It is expected that all participating countries will share their useful experiences and information on PET and cyclotron technology.

Project Leader: Dr. Mohamad Ali, Malaysia



Examples of PET-CT Imaging

Evaluation of FNCA Project Activities

Why evaluate?

The aim of evaluation is to improvement a Project Activity to successful achievement, which is defined as contributing to the enhancement of living standards and social development in Asian countries. The first evaluations were done of eight projects in 2004.

What is evaluated?

The outcomes of project activity are evaluated from two points of view: socio-economic impact; and scientific impact. Publications and ripple effects are also considered.

How is the evaluation used?

The evaluation is reflected in the plan for the project, i.e., continuation, change of content, or termination.

Who does the evaluation?

The evaluation is carried out via the following mechanism.

Mechanism and Procedures of Evaluation

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

Vision

Enhancing socio-economic development through active regional partnership in the peaceful and safe utilization of nuclear technology.

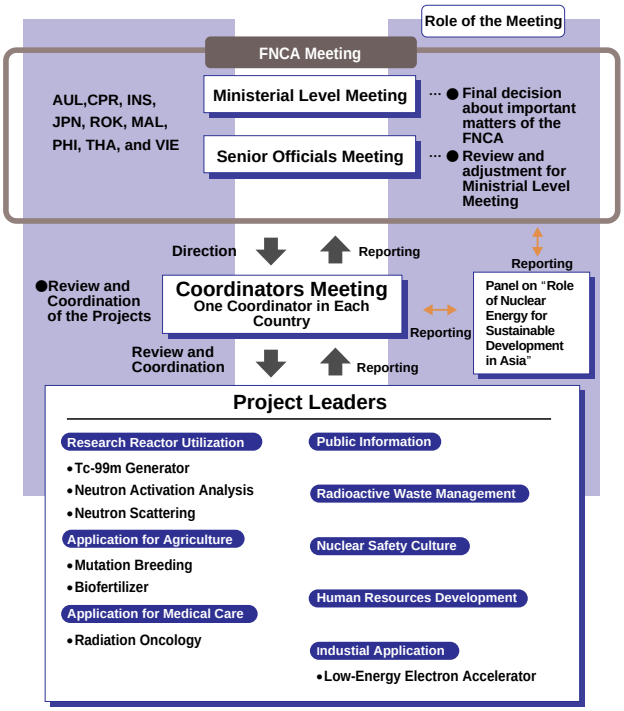
Member Countries;

Australia, China, Indonesia, Japan, Korea, Malaysia, the Philippines, Thailand, and Viet Nam
* IAEA as observer

Framework;

The following are the basic framework 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 preparatory meeting.
2. Coordinators Meeting;
   One FNCA Coordinator was appointed for each country, and these Coordinators discuss introduction, modification, termination, coordination, evaluation, and so on, of cooperative activities.
3. Cooperative activities for each project.



Asia Cooperation Center
Japan Atomic Industrial Forum, Inc.
2-13, Shibadaimon 1-chome, Minato-ku, Tokyo 105-8605 Japan
Tel: 81-3-5777-0753 Fax: 81-3-5777-0757 FNCA Website : http://www.fnca.jp/english/

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