NEWSLETTER

Radiation Safety and Radioactive Waste Management

January 2009

No.1

Nuclear Safety Research Association

RS&RWM Working Towards Establishment of Safety Management

Professor T. KOSAKO
RS&RWM
Project Leader of Japan

The outline of the project

The thirteen years activities of the FNCA RWM project, in which participating countries have been exchanged and shared various precious information and experiences on radioactive waste management, have lead to encouragement of information exchange and to promotion of comprehension at the technical viewpoint among FNCA countries.

It is obvious that the field of radioactive waste management is important for maintaining and improving nuclear safety and radiation application in Asian region. On the other hand, as several Asian countries have practical plans to introduce the nuclear program in the near future, we believe that the activity of radiation safety, which is prerequisite for good managing and operating nuclear facilities, will make our international cooperation more effective.

Taking above things into our consideration, the project of Radioactive Waste Management had better include or expand on the theme of Radiation Safety as closely related theme to radioactive waste management, and accordingly the project name will be reformed as the Radiation Safety & Waste Management (RS&RWM) project. The regenerated project is expected to deal with the field of radiation safety, but still continue the activities of the field of radioactive waste management as before.

As regarding the radiation safety, in general principle, each country should understand properly the contents and concepts of the ICRP's recommendations, the relevant IAEA's safety standards and other basic information concerned. It is recognized, however, that they cannot be applied directly and uniformly as the laws, regulations, standards or criteria of radiation safety in some cases and each country should have enough practical knowledge and insights to utilize them at the phase of application.

Embracing this recognition, the RS&RWM project will include the occupational radiation safety of research reactor and power reactor and public safety, use of radioisotope in research and medical facilities and radiation safety in view of environmental aspects concerning radioactive waste disposal and the other important theme of radiation safety and protection, for achieving the goal of the new project.

The RS&RWM project will consists of workshop which will be held once per year for information exchange among all participating countries, and task works which will be performed by voluntary countries on special topics.

RS&RWM Project Leaders

Mr Lubi Dimitrovski
Manager, Waste Operations, Australian Nuclear Science & Technology Organisation (ANSTO)

Dr. Toshiso Kosako
Professor
Nuclear Professional School
Graduate School of Engineering
The University of Tokyo

Dr. Mohd Abdul Wahab Yusof
Senior Research Officer
Waste Technology & Environment Division
Nuclear Malaysia

Dr. Djarot S. Wisnubroto
Director of Radioactive Waste Technology Center, BATAN

Dr. M. Moinul Islam
Principal Scientific Officer, Institute of Nuclear Science & Technology, Atomic Energy Research Establishment, Bangladesh Atomic Energy Commission

Mr. Sutat Thiangtrongjit
Director,
Radioactive Waste Management Center, Thailand Institute of Nuclear Technology (TINT)

Dr. Le Ba Thuan
Director,
Institute for Technology of Radioactive and rare Elements
Vietnam Atomic Energy Commission (VAEC)

Mr. Zhang Jintao
Deputy Director General
Department of Safety, Protection and Quality China National Nuclear Corporation

Ms. Maria Visitacion B. Palattao
Senior Science Research Specialist
Nuclear Regulations, Licensing and Safeguards Division
Philippine Nuclear Research Institute (PNRI)

In accordance with the establishment of Radiation Safety and Radioactive Waste Management project in 2008, project leaders are newly nominated.

Activities and Achievements

Expected Activities of RS&RWM

Workshops and **task works** will be performed with following objectives and expectations.

(1) To disseminate basic information on Radiation Safety and Radioactive Waste Management
- ICRP Recommendations and IAEA Safety Standards including Basic Safety Standards
- Basic knowledge on radiation source and exposure control
- The ideas such as critical group and critical passes, individuals on radiation protection, dose constraints, optimization of protection, potential exposure, environmental protection, and so on.

(2) To enhance information exchange among participating countries on the theme of radiation

safety and radioactive waste management
(3) To facilitate good communication and cooperation among participating countries
(4) And the other fruitful results through communication among participating countries

RS&RWM Newsletters will be published twice in a year by Japanese FNCA office and host country of the workshop.

RS&RWM Reports will be published in accordance with the progress of the project.

Consolidated reports are expected to be published every three year as a result of our workshops, task works and other related activities on radiation safety and radioactive waste management.

News Topics in Participating Countries

In Quake´s Aftermath, Chinese Sift Through Rubble for Radioactive Sources

Mr. Zhang Jintao
Deputy Director General
Department of Safety, Protection and Quality
China National Nuclear Corporation

Mr. Sun Qinghong
Senior Scientist,
Department of Radioactive Waste Management, China Institute for Radiation protection

In the wake of the strongest and deadliest earthquake to ravage China in decades, the 7.9-magnitude earthquake of 12 May devastated China´s Sichuan Province, killing an estimated 69,000 people and causing extensive property damage.

Among the many dangerous materials buried in the rubble lay hidden enemy – stray radioactive sources that could complicate relief efforts or cause contamination.

So when the Sichuan earthquake struck, Chinese authorities sprang into action. Utilizing IAEA training and donated equipment, Chinese emergency teams were deployed to the affected area for recovery efforts.

Immediately after the earthquake, experts from relevant Chinese authorities were sent to examine the safety status of nuclear facilities and radioactive sources within the quake zone. In the two weeks immediately following the earthquake, a team of radioactive source search and recovery experts fanned out across all disaster-stricken areas. The teams used radiation detection equipment to pinpoint the location of 50 sources and safely recover all of them.

Chinese authorities working to recover radioactive sources in the wake of the 12 May Sichuan earthquake.

Radiological Impact Assessment of Routine Atmospheric Releases from Serpong Nuclear Research Complex*

Dr. Djarot S. Wisnubroto
Director of Radioactive Waste Technology Center, BATAN

Dr. Syahrir
Head of Safety and Environment Division, National Nuclear Energy Agency of Indonesia (BATAN)

Nuclear Installations in Serpong has been operating for more than 20 years and being monitored for their atmospheric releases. For proper evaluation of environmental impact of the releases, site specific environmental data has been updated and followed by radiological impact assessment. Regular public dose assessment in Serpong is aimed to ensure the nuclear installations comply to radioactive discharge guidelines; only atmospheric releases are assessed in this discussion.

GENII computer code (GENII V-2) developed by Environmental Protection Agency (EPA) in Pacific Northwest National Laboratory (PNNL) has been used to assess the radiological impact of atmospheric releases from Serpong Nuclear Research Complex. Five year latest environmental data have been used for the assessment. The annual source term data originate from the Multipurpose Reactor (RSG), the Radioisotope Production facility of Batan Teknologi (BANTEK), the Radiometallurgy installation and the Radioisotope and Radiopharmacy Research Installation. Five year recorded hourly meteorological data were compiled into joint frequency distribution of wind speed, wind direction and atmospheric stability. National Statistics Bureau (BPS) Tangerang had contract with National Nuclear Energy Agency (BATAN) Serpong to provide information related to environmental pathways exposures surrounding Serpong site.

The assessment considers the radiological impact of continuously normal releases since the beginning of the operations (1987) up to 2007. Public doses in 2007 take into account yearly accumulation of air deposition to the ground and losses of radionuclides by leaching, weather, harvest and radioactive decay in the surface soil.

The combined effects of releases from more than one source within the context of a straight line plume model is accomplished by establishing a polar grid, determining the position of each source within the grid, and calculating the position of the receptors relative to the source. Individual and collective effective doses are calculated for 16 sectors and 10 distances within 5 km radial from the site.

The assessment results of the individual effective doses for public within 5 km radial to the site are shown in Figure 1. The maximum public dose took place at southern sector with radius 300 m, i.e. 98 µSv. The occurrence relates to the very high frequency of wind speed less than 5 m/s to the south. Most of the dose is contribution from BANTEK (99.5%) followed by RSG (0.4%). Table 1 shows this dose distribution from the pathways which equally distributes among the external ,inhalation and ingestion routes. The major pathways are external exposure from soil contamination, outdoor inhalation and leafy vegetable ingestion.

Figure 2 shows estimation results of the collective effective dose distribution for public within 5 km radial to the site in grids. The highest collective dose (22.54 person-mSv) corresponds to a heavy population density in the area as shown in Figure 3, i.e. Serpong municipality. This area and its surroundings have better road facilities than one in the northern side with lower population density.

* Summarized from "Kajian Dampak Radiologi Lepasan Atmospheric Instalasi Nuklir Serpong" (*Radiological Impact Assessment of AtmosphericReleases from Serpong Nuclear Installations*), BMG-BATAN, Ciputat, 2007

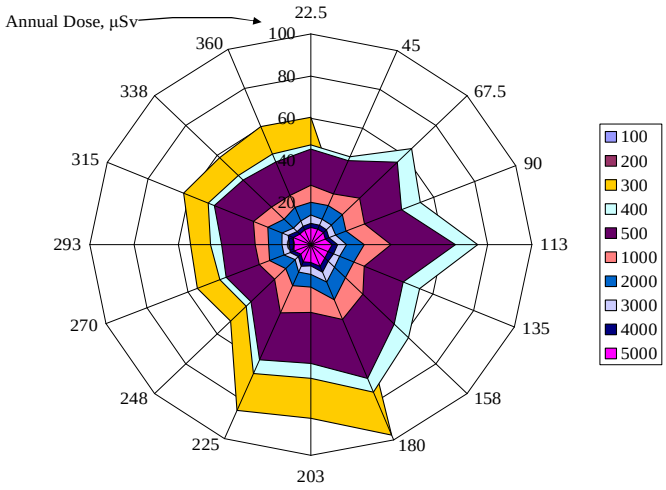


Figure 1. Estimation of individual effective dose distribution from Atmospheric releases of Serpong Nuclear Installations on 2007 calendar year.

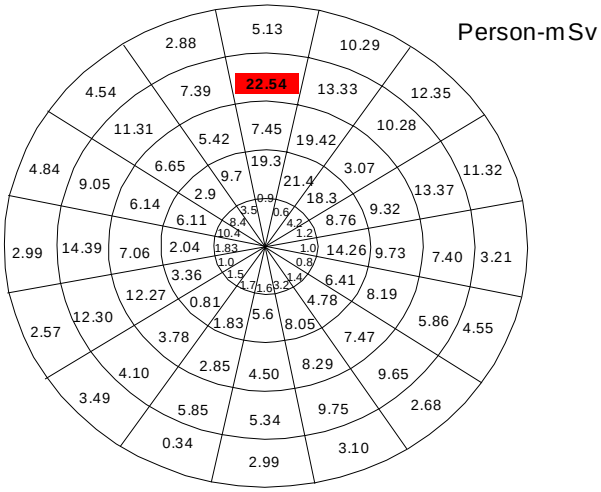


Figure 2. Distribution of collective dose estimation within radial 5 km to the reactor site.

Table 1. Relative individual effective dose distribution based on pathways.

ROUTE	PATHWAYS
External (33%)	Soil (79%), Air (21%)
Inhalation (33%)	Indoor (69%) Outdoor (31%) Soil (0%)
Ingestion (33%)	leafy vegetables (77%) rice (17%) root vegetables (3%) meat (2%) fruits (1%) chicken eggs (0%) chickens (0%)

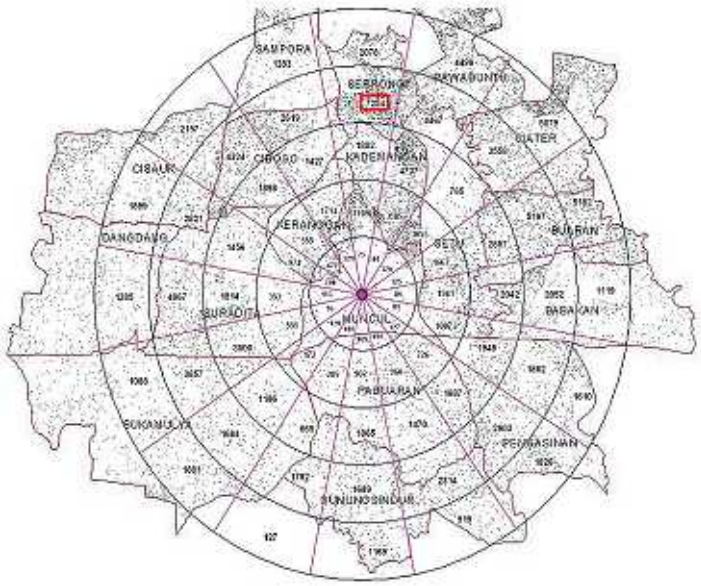


Figure 3. Population distribution within 5 km from reactor site.

Nuclear and radiation technology in Malaysia

Dr. Mohd Abdul Wahab Yusof
Senior Research Officer, Waste Technology & Environment Division, Nuclear Malaysia

In Malaysia, nuclear and radiation technology are being used mainly in industry, medicine, research and education. Malaysia does not have a nuclear power, but there is a 1 MW research reactor used for the purpose of research and isotope production. Nuclear gauges, oil logging tools, radiographic devices and gamma irradiators are mainly used in industry. On the other hand, in hospitals, nuclear technologies are used in nuclear medicine, radiotherapy and diagnostic equipment and facilities. Research and education typically use much less amount and activity of short-lived radioactive materials.

There is a legislative framework established to control practices involving radiation safety, transportation of radioactive materials and safe management of radioactive waste in Malaysia. The Atomic Energy Licensing Act 1984 (Act 304) forms the basic legal systems and it is supported by sets of regulations and orders. The legal framework is also supported by various other non-legal binding technical documents, such as technical guidance and codes of practice, produced specifically to provide more detailed guides on how to comply with certain specific requirements of the regulations and the Act.

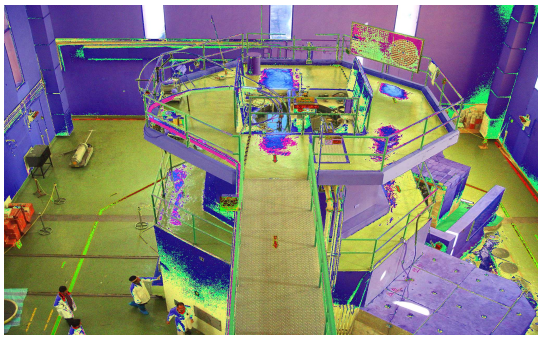


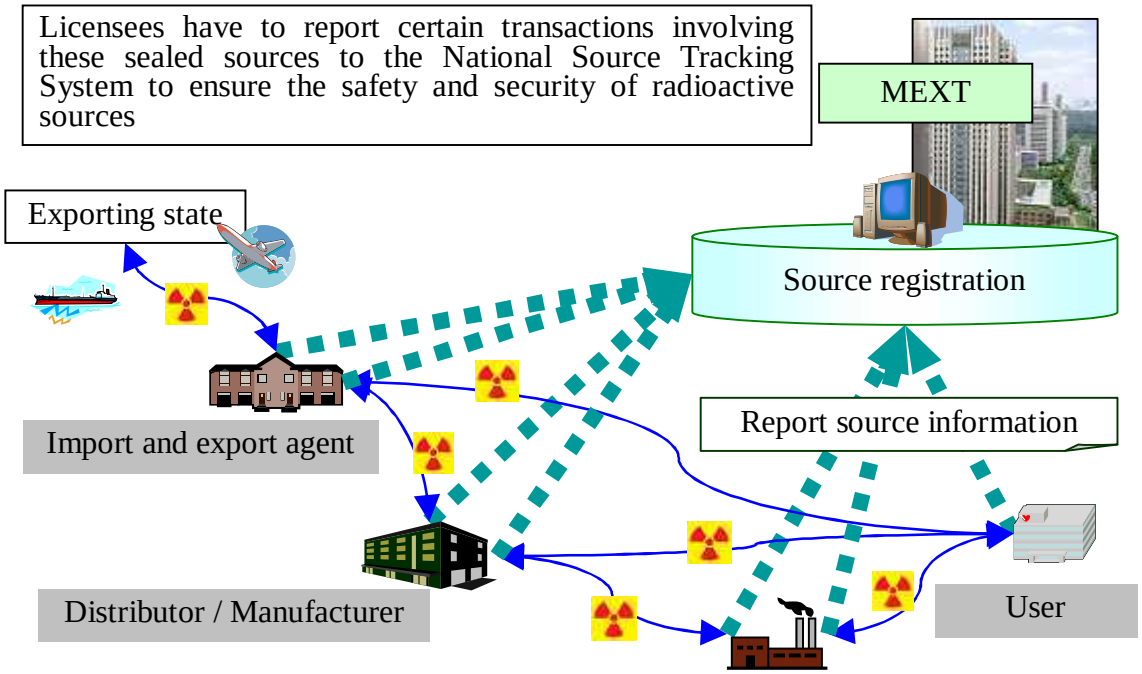
Figure 1: Nuclear Malaysia's Reactor TRIGA PUSPATI (RTP)

The preparations situation of National Sealed Source Registration System in Japan

Dr. Shoji Futatsukawa
General Manager, Radioisotopes Division, Japan Radioisotope Association

IAEA opened Code of Conduct on the safety and security of radioactive sources on 2003 in order to protect individuals, society and the environment from the harmful effects of possible accidents and malicious acts involving radioactive sources. Moreover, IAEA provides a categorization by activity levels for radionuclides that are commonly used, based on D-values which define a dangerous source that could, if not under control, give rise to exposure sufficient to cause severe deterministic effects. Sterilization irradiation sources, blood irradiation sources, gamma knife sources, NDT sources, industrial devise sources and so on as dangerous sources of category 1, 2 and 3 are used in around 700 hospitals and facilities in Japan. According to the Code of Conduct, Japanese Export Trade Control Order was amended in 2005. The Amended Order applies to sealed sources (not less than 300GBq) requesting to get approval of importing state for the sources prior to shipment of them. Moreover, Japanese Authority prepares to start National Sealed Source Registration System which will be tried out by important users including JRIA in July, 2009. The concept of the System is that licensees having a dangerous sealed source should register the source specific information, recipient information and act information to MEXT every time the source being transferred (See figure).

D-values: Dangerous quantities of radioactive material
NDT sources: Nondestructive testing sources
JRIA: Japan Radioisotope Association



Concept of National Sealed Source Registration System in Japan

Nuclear Safety Caravan in the Philippines

Ms. Maria Visitacion B. Palattao
Senior Science Research Specialist, Philippine Nuclear Research Institute

The Philippine Nuclear Research Institute's (PNRI) Nuclear Regulations, Licensing and Safeguards Division (NRLSD) launched a nationwide nuclear safety awareness program that aims to promote the open exchange of safety and security information involving the various users of radioactive materials in the country. In view of the government's plan to revisit the nuclear power option, the program was also used as a vehicle to discuss and interact with local government officials and members of the general public regarding safety and regulation of nuclear power and radioactive waste management and disposal. Aside from lectures and presentations, a demonstration was also made on the use of state of the art equipment for radiation detection and measurements. The seminar participants were given the chance to explore, test and use the equipment for better appreciation and understanding of the lectures presented.

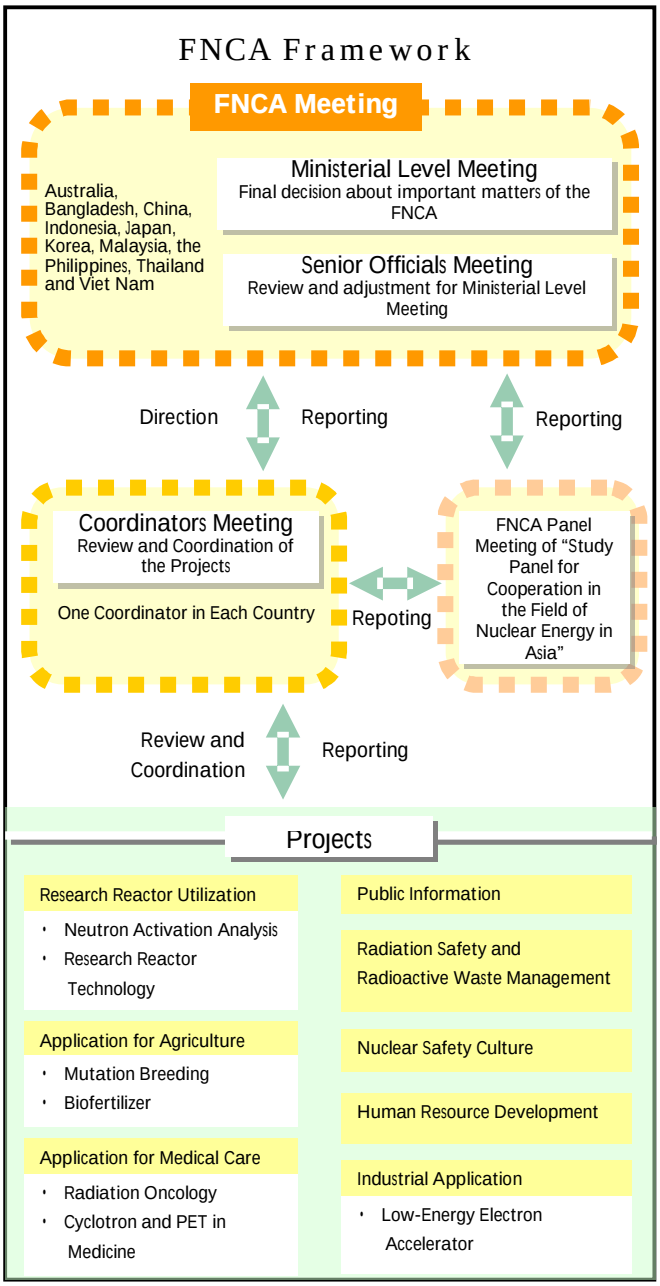
Figure 1. Awareness Seminar for Members of the General Public

Figure 2. Demonstration of state of the art radiation detection and measuring instruments

FNCA2008 Workshop on Radiation Safety and Radioactive Waste Management (RS&RWM)

November 3 -7, Sydney, Australia

FNCA2008 Workshop on the RS&RWM was held in Sydney Australia from November 3 to 7, 2008, hosted by ANSTO, as a local host organization, and MEXT of Japan, in cooperation with NSRA. Thirteen specialists on this field attended the Workshop and had an information exchange and discussion about radiation safety and radioactive waste management. The further information will be reported on the Newsletter No.2, which is expected to be issued by ANSTO.



A frame work called "Forum for Nuclear Cooperation in Asia (FNCA)" has been established under the initiative of Japan, where participating countries are engaged on an equal partners in the activities for nuclear energy utilization, with a view to making use of nuclear technology for better life of the people through mutual cooperation among Asian countries.

Since the first FNCA meeting held in Bangkok, Thailand in 2000, the member nations have been developing cooperative activities in various fields, based on the equal partnership.

Information for AOCRP-3

The 3rd Asian and Oceanic Congress on Radiation Protection (AOCRP-3) will be held in Japan.

Date: May 24-28, 2010

Location: Tower Hall Funabori, 4-1-1
Funabori, Edogawa, Tokyo Japan

Website: http://www.aocrp-3.org

E-mail: info@aocrp-3.org

Nuclear Safety Research Association

5-18-7 Shinbashi Minato-ku Tokyo 105-0004 Japan

Tel:81-3-5470-1983 Fax:81-3-5470-1991 FNCA Website:http://www.fnca.mext.go.jp/

This Newsletter is issued by Nuclear Safety Research Association (NSRA) under the contract with the Ministry of Education, Culture, Sports, Science and Technology (MEXT)