

**Session Summary of
FNCA 2015 Workshop on
Radiation Safety and Radioactive Waste Management**

Session I: Country Report Presentation

- Nuclear/Radiological Emergency Preparedness and Response –

1-1) Bangladesh (Dr M. Moinul ISLAM, Bangladesh Atomic Energy Commission)

The country paper briefly described the current Bangladesh Atomic Energy Commission (BAEC) organizational structure including the existing scientific staff at BAEC. The report also highlighted regulatory framework and responsibilities according to BAER act 2012. The report includes details policy, regulatory framework, concept of operation, participating organization, mitigation and prevention, human capacity building, communication and public relation under nuclear/radiological emergency regime.

1-2) China (Mr Cheng Qifu, China National Nuclear Corporation)

The presentation introduced the structure of nuclear emergency preparedness and response management in China. China established a series of laws, regulations, technical guides and standards in the field of nuclear emergencies. The principles of emergency management of nuclear accidents should be unremitting preparedness, positive compatibility, unified command, energetic co-ordination, protection of the public, and protection of the environment.

In China, three-level emergency organizational system has been established , consists of national nuclear emergency organization, provincial emergency organization and the nuclear facility's emergency organization. National Coordinating Committee for Nuclear Accident Emergency(NCCNAE) organizes and coordinates the country-wide nuclear emergency management arrangement. Provincial emergency organizations are responsible for nuclear accident emergency preparedness and emergency response within their administrative areas, and command off-site nuclear accident emergency response actions. Nuclear accident emergency organizations of nuclear facilities are responsible for onsite nuclear accident emergency.

Based on the nature, severity, radiological consequences and affected extent of nuclear accidents, the emergency events are classified into four levels, emergency standby, plant emergency, plant area emergency, and offsite emergency (overall emergency), to which response Level-IV response, Level-III response, Level-II and Level-I response, respectively. NCCNAE has established professional emergency rescue teams in aspects of enhanced rescue, radiation monitoring, decontamination and cleanup, contamination control,

radiation protection, medical rescue. According to the regulations, three-level emergency organizations and emergency rescue teams should participate periodic professional training, emergency exercise and drills, keep emergency response capabilities.

The National Nuclear Accidents Emergency Response Office has established information communication network to enhance communication with relevant departments, local governments, the NPPs and the public. The operating organization of NPP takes various measures such as publicizing propaganda material and inviting local public to visit plant and to take part in or to watch emergency exercises, and to effectively participate in emergency response activities in case of an emergency.

1-3) Indonesia (Mr Moch Romli, National Nuclear Energy Agency of Indonesia)

Indonesia has had policy and legal framework to regulate Nuclear Emergency Preparedness and Response, from Act level to Standard level. Its contain rules and guidance for Nuclear EPR like requirements for radiation and nuclear facility, EPR Organization Structure and the function, and determine the nuclear emergency category. Nuclear emergency class in Indonesia were in the range category 2 to category 4. The highest class of nuclear emergency in Indonesia (category 2) are owned by Multi-Purpose Reactor in Serpong (30 MWt) and Research Reactor TRIGA 2000 in Bandung (2 MWt). On national scale, participating organization can be found in structure of EPR Organization. Head of National Disaster Management Agency acts as Chairman of EPR Organization, assisted by concessioner of facility and Deputy of National Disaster Management Agency. Reporting is done to Nuclear Energy Regulatory Agency (NERA/ BAPETEN). To support the operational, there are Indonesia National Army, related ministers and agency. And then, for the technical operator, there are Police, Firefighters, and Medical Ambulance as a first responder. And for the radiological assessor, there are National Nuclear Energy Agency (NNEA/ BATAN), Nuclear Biology Chemistry Squad from Indonesia National Army, and from Meteorology and Geophysic Agency. Concept of the operations starts from prevention, mitigation, preparedness, response, and rehabilitation. Stakeholders have organized the training, drill & exercise, and the others related activity to implement and improve the EPR Program.

1-4) Japan (Prof Toshiso Kosako, The University of Tokyo)

In Japan, the organizational structures as well as legal framework have been changed after experiences of nuclear accidents and natural disasters.

emergency situation can be divided into 4 phases, Preparedness, Early Response, Medium-term response and Recovery.

In the early response phase, emergency classes can be categorized into 3 types, Alert, Site Area Emergency, and General Area Emergency.

Participating organization include Nuclear Emergency Response Headquarters (NERHQ), led by Prime Minister and also local government NERHQ. NERHQ is supposed to respond

to the accident, issue evacuation orders, support and cooperate with other municipal governments.

One example of Local government NERHQ is an off-site center. In conclusion, there are four important things to consider for the emergency situation. First thing is the possibility of combined disaster such as a combination of natural disasters, ie, Earthquake and Tsunami. The second is political situation. It is important to think of realistic and practical governmental flow that can effectively work during emergency situation. To realize this, top down leadership is also crucial. It is also important to ask appropriate specialist for advice. It is also effective to use media or social network to promote public understanding. When it comes to international relations, it is important to be fully aware of the difference in legal system of each country.

1-5) Kazakhstan (Mr Yevgeniy TUR, National Nuclear Center of the Republic of Kazakhstan)

The policy of the Republic of Kazakhstan in the field of emergency preparedness and response regulates social relations during activities for protection of workers and population. Regarding nuclear and radiation safety, the policy of Kazakhstan is based on the “National plan for response to nuclear and radiological accidents”, which is approved by the Government of the Republic of Kazakhstan.

Modern regulatory framework of Kazakhstan is represented by four-level structure of documents: 1) laws and Decrees of the President; 2) resolutions of the Government; 3) rules and regulations approved by central government authorities; 4) standards, guidelines, typical instructions and so on.

In order to determine the level of measures for emergency preparedness and response planning, Kazakhstan uses five emergency planning categories. For determination of the level of response in the case of radiation accidents Kazakhstan uses following classes of the accident: general accident, local accident, facility accident, threat of accident and incident. Levels of planning for facility where there is a probability of accidents with a large off-site release vary in different areas and, depending on distance of these areas from the facility, are named: 1) preventive protective action zone, 2) urgent protective action zone, and 3) long-term protective action zone. Close cooperation at three levels is implemented for effective response in case of emergency: 1) enterprise level; 2) territorial/local level; and 3) state/central level. Almost all ministries and state departments of the Republic of Kazakhstan are involved in the state system of response to radiation accidents. Their main responsibilities include the implementation of measures for prevention of and response to radiation accidents at their subordinate enterprises.

Prevention of emergency situations and mitigation of their consequences at all stages of life cycle of radiation-hazardous object are provided through consecutive implementation of organizational and technical measures.

The central and local executive authorities should develop their plans to respond to radiation emergencies taking into consideration specifics of core activities, regional and local

characteristics. Enterprises engaged in the activities concerned with use of nuclear energy should prepare: list of potential radiation accidents with a forecast of their consequences; action plan for protection of personnel and public from radiation accident and its consequences; means for warning and eliminating the consequences of the radiation accident, and so on.

Enterprises, where radiation accidents have happened, are responsible for taking measures to protect personnel and public, accident localization and elimination of consequences, as well as timely notification to central and local executive authorities.

Education of public to methods of radiation protection is carried out by local executive authorities, territorial authorities of Committee for Emergency Situations and training centers of enterprises (engaged in activities related to use of atomic energy). This education is implemented through studies, through trainings at the place of work, study and life, and through special drills. Three types of exercise are specified in the Republic of Kazakhstan in the field on Emergency Preparedness and Response: comprehensive drills, table-top exercises, facility trainings.

Information about threat or occurrence of radiation accident is transmitted from enterprise to different government structure. The central and local executive authorities take a decision on informing public through the media or alert systems, if necessary.

1-6) Malaysia (Dr Wan Saffiey Bin Wan Abdullah, Malaysian Nuclear Agency)

Malaysian Nuclear Agency is the main user of radioactive sources in Malaysian, about more than 600 sources which including Research Reactor TRIGA Mark II (1 MW) have been licensed. The activities involving research & development and services for industries, medical and environmental, In order to ensure the control of any emergency consequence from the use of radioactive source and nuclear material, there are two basic legal infrastructures which are used for management of nuclear and radiological emergency. Then Directive No 20 of National Security Council (NSC) which is the Policy and Mechanism on National Disaster and Relief Management and the Atomic Energy Licensing Act 1984 (Act 304). Under the Directive No 20, NSC is responsible for managing the whole operation of nuclear and radiological emergency, whether it is at national, state or district level, if the emergency is considered disaster and the Atomic Energy Licensing Board (AELB) is a lead technical agency whereas Malaysian Nuclear Agency will be called if there is a need technical assistance in handling the emergency. The Directive is also outlined the functions and responsibilities of other agencies involved during the emergency such as Armed Forces, Police Forces, Fire and Rescue Department, Health Department, Civil Defense Department etc. In addition Malaysia is a signatory of two conventions related to nuclear and radiological Accident which are the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency and the Convention on Early Notification of a Nuclear Accident. In compliance with the function as lead technical agency, AELB has established a National Emergency Control Center are equipped with complete

infrastructure and human capital operating in 24 hours. On the emergency preparedness the detection equipment are installed in most of the main entrance of the country including the main mega port and all data are transferred remotely to the control center at the AELB. In the event of nuclear disaster from the neighboring countries and the regional countries, five radiological monitoring stations have been installed throughout the countries. Training, drill and exercise on radiological emergencies have been conducted on regular basis at scale of both locally and nationally that involved of multi-agencies.

Generally, Malaysia is still needs support from international organization to enhance its capabilities in preparedness and response to nuclear or radiological emergency, which inline to international standards and requirements. Assistance is still required, particularly in the area of internal dose measurement from the contamination of radioactive material, the development of bioassay and whole body or spectrum analysis methods which includes biological Dosimetry. Training, drill and exercise are required to develop expertise to enhance Malaysia capability to manage any nuclear or radiological emergency.

1-7) Mongolia (Ms Navaangalsan Oyuntulkhuur, Nuclear Energy Commission of the Government of Mongolia)

Nuclear energy law has been amended and regulatory body and other relevant organizations restructured in Mongolia in 2015. An Executive Office of Nuclear Energy Commission has established and replaced by the Nuclear Energy Agency, which had been close down the activity. Regulatory Department of former NEA has been transferred to the General Agency for Specialized Inspection /GASI/.

New regulations and basic safety standard has been approved by the Nuclear Energy Commission in 2015.

All hazard disaster or emergency response in Mongolia is coordinated by the National Emergency Management Agency. Executive office of the Nuclear Energy Commission and General Agency for Specialized Inspection (GASI) play a role within a multiagency response and providing technical adviser in the case of nuclear and radiological emergency.

There is urgent need to strengthening of national infrastructure for emergency preparedness and response for Mongolia. Establishment of national program for emergency preparedness/response, identification of gaps and updating of national nuclear/radiological emergency response plan are the main goal for the near future.

1-8) Thailand (Ms Nanthavan Ya-anant, Thailand Institute of Nuclear Technology)

The National Nuclear and Radiological Emergency Plan has been approved by the Atomic Energy Commission since 2010. Five statements in the national policy on Nuclear/Radiological Emergency Preparedness and Response were reported. She then introduced the issues in regulatory framework and legislation about main laws and relevant regulations. She also

explained about the five emergency classes and conditions. The participating organizations, enterprise, government (central and local) and non-government involved in Nuclear/Radiological Emergency Preparedness and Response were also introduced. She explained about the integral operational disaster plan for Nuclear/Radiological Disaster in ministerial level. Each organization has their own response teams established their ICS. Finally she gave the information about the training, workshops, and drills on Nuclear/Radiological Emergency Preparedness and Response and the public relations via several medias.

1-9) Vietnam (Dr PHAM Quang Minh, Vietnam Atomic Energy Institute)

Now in Vietnam, radiation and radioisotopes have been applied in health care, agriculture, industry, geology, mining, meteorology, hydrology, transport, construction, oil and gas industry, etc.

There is only one nuclear installation in the country is the Dalat nuclear research reactor with capacity of 500 kW.

In order to meet the energy demand in the future, the first nuclear power plant (NPP) will be put in operation in 2020 with capacity of 2000 MW and the second NPP with capacity of 2000 MW will be put in operation in 2021.

Atomic Energy Law had been approved at the twelfth National Assembly Session 3 on 3rd June 2008 and come to enforce on 1st January 2009. The Atomic Energy Law includes 11 Chapters with 93 Articles. Chapter X includes the following contents: Emergency preparedness for radiation and nuclear incidents and accidents; Compensation for damage.

VARANS have been also assigned to develop National Nuclear and Radiological Emergency Response plan. The Draft of the plan is available and is reviewing by related organizations. It will be submitted for Prime Minister approval in 2015.

This presentation includes the following main contents: Policy and Objectives of Nuclear Radiological Emergency Preparedness & Response; Regulatory Framework and legislation; Emergency Classes and Condition; Participating Organization; Concept of Operation and Related Activities.

Session II: Review and Update of Consolidated Report on Nuclear/Radiological Emergency Preparedness and Response

Ms Emi Imaizumi reported the progress of the consolidated reports and proposed working schedule for the report. Member countries agreed to finalize the first compiled draft by March 2016.

Session III: Discussion on status, plans and challenges of low/Intermediate level waste disposal facilities/long term storage facilities

3-1) Vietnam (Dr PHAM Quang Minh, Vietnam Atomic Energy Institute)

Radioactive waste in Vietnam is generated by research, industry, medical applications, research reactor operation and radiopharmaceutical production. Naturally occurring radionuclides

(NORM) and technologically enhanced naturally occurring radioactive materials (TENORM) are produced in Vietnam by the mining, mineral sands processing and other resources sectors. Vietnam has no nuclear power plants.

Vietnam is considering to introduce the nuclear power to meet growing demand in electricity and to ensure energy security. Two Nuclear Power Plant (NPP) projects in Ninh Thuan province (Ninh Thuan 1 and Ninh Thuan 2) are under Feasibility Study (FS) phase. Four NPP units with capacity of about 1000 MWe each will start operation around 2020.

So far, Vietnam has no national used radioactive sources and radioactive waste storage facility. This presentation includes the following main contents: The Radioactive waste management policy; Legislation Framework; Current management of RW in Vietnam; Site selection for Low Level Radwaste Central Facility and Challenges, plans and proposals in RWM in Vietnam

3-2) China (Mr Cheng Qifu China, National Nuclear Corporation)

The presentation introduced the status and challenges of radioactive waste management in China. It also briefly describes the status and future plan of China's nuclear power development. China has established a comprehensive legislative and regulatory system of radioactive waste management. There are two near surface disposal facilities in operation, including northwest disposal site and Beilong disposal site, the third near surface disposal facility under construction. Radioactive waste amounts generated from NPPs, large portions still in storage facilities at NPPs, with only small parts delivered to the outside for disposal. Report discusses the challenges of radioactive waste management. For example, disposal ability of waste and sustainable development of nuclear power does not match. The total amount of radioactive waste generated from NPPs is gradually increased with increase of runtime and number of operational nuclear reactors.

3-3) Japan (Mr Hiroyuki Murakami, Institute of Radiation Measurements)

The management of radioactive waste is quite important and crucial for peaceful uses of nuclear and radiation. In Japan, basic principles and directions for radioactive waste management, especially methods of its disposal and long-term storage, have been a big issue. Now, some pilot programs and actual waste disposal/storage programs for low and intermediate level radioactive waste are being conducted by organizations, such as JAEA and JNFL. Additionally, the NPP accident in Fukushima, 2011 generated huge amount of unexpected radioactive waste in Japan. The Government program for disposal/storage of the radioactive waste in Fukushima area is also now being carried on under the special law.