Annex 3

Session Summary of FNCA 2014 Workshop on Radiation Safety and Radioactive Waste Management

Session I: Country Report Presentation

- Nuclear/Radiological Emergency Preparedness and Response -

1-1) Australia (Ms.Lynn TAN Australian Nuclear Science and Technology Organisation)

Australia ratified the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency in 1987. Although not in possession of any “nuclear installations” defined in the Convention on Nuclear Safety, Australia also ratified the convention in 1996. Australia supports the international strengthening of radiological and nuclear emergency preparedness and response through our participation in the National Competent Authority meetings and IAEA activities and the registration of our capabilities with the IAEA Response and Assistance Network (RANET) from both the Australian Radiation and Protection and Nuclear Safety Agency (ARPANSA) and the Australian Nuclear Science and Technology Organisation (ANSTO). In Australia, each State and Territory, as well as the Australian Government, are responsible for the health and welfare of their citizens and maintains an emergency response capability consistent with the anticipated risk from nuclear and radiological activities within that jurisdiction. Ongoing training in EPR takes the form of lectures, field deployment and exercises at local, national and international level.

1-2) Bangladesh (Dr. M. Moinul ISLAM Bangladesh Atomic Energy Commission)

The country paper highlighted the current Bangladesh Atomic Energy Commission (BAEC) organizational structure including the human resource numbers involved in BAEC work. The report also touched on the various radiation uses including radiation facilities at BAEC and within Bangladesh. The Control of occupational radiation exposure and the Status of Radiation Safety Management in different radiation and nuclear facilities are discussed in the report. The presentation also provided details on national emergency response plan and for TRIGA Mark II research reactor as well.

1-3) Indonesia (Dr.Budi Setiwan National Nuclear Energy Agency of Indonesia)

Nuclear installations in the SNRC are designed, built, and operated subject to the requirements of safety and security are governed by regulations and safety standards in both national and international. On the basis of improved standards of safety and security accompanied the fact that may not eliminate the risks of accidental, the nuclear emergency programs in SNRC needs to be done, and with emergency preparedness will be able to do an effective countermeasure against the consequences of the non-Radiology and radiology both in on-side and off-side of the SNRC area. The emergency program includes preparedness and planning of nuclear emergency countermeasures in-and off-sides areas. In the presentation are described in general terms the type and activities of nuclear installations on SNRC, the general state of the SNRC as well as the type of accident that could give rise to consequences of Radiology in-and off-side of SNRC, response plan, evacuation processes and other actions. From the results of studies on the impact of the worst radiology accident from the RSG-GAS reactor showed that the radiology impact will include the SNRC site and the PUSPIPTEK area with the possible lower radiology impact occurs in outside of the PUSPIPTEK area. Emergency organizations conduct response in accordance with the emergency conditions in SNRC against the nuclear accidents at a facility. Organizations only perform countermeasures actions in the in-side area and give recommendation of countermeasure actions for tackling off-side area to the local government if there is any radiology consequence in the off-side area. The Local Government then do the countermeasure action in off-side area, such as: evacuation of community, administering potassium iodide tablets, and others. The EPR program that governs at off-side area will be made separately with this program which planned preparedness and implementation of countermeasures to the members of the community and also the restoration of the area due to the impact of radiology. The off-side program later should be aligned with the SNRC emergency preparedness program as well as assistance program from outside, hopefully it can be generated a common understanding in communication and the availability of adequate infrastructure of all parties.

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

Difficulties during the emergency at Fukushima Daiichi NPP include setting the site evacuation areas and prediction of radionuclide diffusion and simulation. Processing and disposal of contaminated materials considered as radioactive waste as well as intervention level to control food distribution and consumption were also carefully discussed after the accident.

On site issues that TEPCO is currently facing include stability of damaged reactor core cooling, melted core fuel handling(technology development, remote handling, including robot tech.), stabilization of radioactivity especially in gaseous waste, solid and liquid waste, radioactive wastes including melted core, intermediate storage, processing, and final disposal.

Second issues are the doses that radiation workers are receiving, the provision for dose limits, safeguard and security , regulatory arrangement (Tunami, Earth-quake), progress schedule (2, 5, 10, 20 years), funds and government and political positioning.

Outlines of Tokai-mura JCO accident were also mentioned explaining how the JAEA Naka environment monitoring detected the nuclear release, the result for neutron monitoring based on sky shine effect, dose evaluation of people within the JCO vicinity and the facility workers, dose evaluation using simulation exercise, and the IAEA report on the sharing of information and the significance of drills and exercise to avoid accident.

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

Kazakhstan established series of laws, technical regulations and other legal acts in the field of nuclear energy as well as emergencies.

In order to determine the level of requirements for emergency preparedness and response, Kazakhstan uses five emergency planning categories which are the same as five threat categories in the recommendations of IAEA.

For rapid and coordinated response and for determination of the level of response in the case of radiation accidents, Kazakhstan uses classes of the accident: General accident, Local accident, Facility accident, Threat of accident, and Incident.

For dangerous facilities, Kazakhstan distinguish a planning between three emergency planning zones: Preventive protective action zone, Urgent protective action zone, and Long-term protective action zone.

In Kazakhstan, there are three levels of responsibility for planning and response in the case of an accident: the national level, regional or local level, and the level of the enterprise.

According to Kazakhstan's regulatory documents, enterprises, which have potential for severe release of radioactive substances, have to establish special emergency teams. There are a few such special emergency teams in Kazakhstan which participate in the annual on-site trainings and in 3-year complex trainings.

At the beginning in 2010, experts of NNC began to participate in the instructor training program on "Nuclear and Radiological Emergency Preparedness" which is held by the Japan Atomic Energy Agency. Five instructors were trained in the program for Kazakhstan. These instructors started domestic courses in Kazakhstan in 2012. To date, they conducted three domestic courses.

There are more common courses in Kazakhstan on preparedness and response to any natural or anthropogenic emergency. They are conducted at the National Training Center of Civil Defense of the Ministry of Emergency Situations of the Republic of Kazakhstan from 1959. About 1,500 to 2,000 people are trained annually in the Center. In addition to domestic courses, center conducts international courses.

National Nuclear Center of the Republic of Kazakhstan conduct works on restoration of the Semipalatinsk nuclear test site (STS). Between 1991 and 2014 National Nuclear Centre of Kazakhstan in cooperation with international organizations and research centers have performed large amount of research as well as activities aimed at reducing the risks from STS.

1-6) Malaysia (Dr. Mohd Abd Wahab Bin Yusof　Malaysian Nuclear Agency)

In Malaysia, the possibility sources of nuclear and radiological emergency comes from such as hospitals, universities and research institutes, space debris from nuclear powered satellites, transportation of radioactive materials or wastes, sabotage or nuclear terrorism such as dirty bomb, research reactor, nuclear powered carrier or submarine when berths at Malaysian harbours etc. At national level, the National Security Council of the Prime Minister's Department has published Directive No. 20 – The Policy and Mechanism on National Disaster and Relief. The purpose of this Directive is to outline a policy on disaster management and relief on land, according to the level of disaster. This Directive also identifies and determines the roles and responsibilities of the various agencies involved in handling disasters, and Atomic Energy Licensing Board (AELB) has been identified and designated as the Lead Technical Agency for nuclear and radiological emergency in Malaysia. In order to handle disasters more effectively, the Disaster Management and Relief Committee (DMRC) has been established at the federal, state, and district levels. A Radplan that outlines the procedures for radiological emergencies in Malaysia and a Radiological Emergency Response Centre has also been established and Nuclear Emergency Team on 24-hour standby, with trained officers equipped with all necessary equipment and communication systems to respond if any emergency situations arise. National radioactive and nuclear detection system is also established all around Malaysia. Training, drill and exercise are conducted at regular basis whether by the AELB or licensee. At international level Malaysia is a signatory of Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency and Convention on Early Notification of a Nuclear Accident.

In conclusion, basic infrastructure for emergency preparedness and response is already in place in Malaysia. However, Malaysia still needs to enhance its capabilities in preparedness & response to nuclear or radiological emergency in line with international standards and requirements. Training, drill and exercise are essential to enhance Malaysia capability to manage any nuclear or radiological emergency. The assessment of Malaysia's capability to respond to nuclear and radiological incidents and emergencies by the expert team can assist Malaysia to enhance the existing capabilities.

1-7) Mongolia (Ms.Munkhtogtokh Baatar Nuclear Energy Agency of the Government of Mongolia)

National Emergency Plan of Protection from Radiological Hazards was established in 2010 by Director general of NEA and was updated in 2013. National Emergency Management Agency (NEMA) was established on 9 March 2005. All hazard disaster or emergency responses in Mongolia are coordinated by the NEMA. Thirteen disaster management agencies established in 2012 by the government resolution 186 under the Deputy Prime Minister. Nuclear Energy Agency (NEA) is one of the disaster management agency and plays a role within a multi-agency response and providing technical advisor in the case of nuclear and radiological emergency. The NEA has the responsibility to ensure that emergency preparedness and response arrangements are in place for all nuclear and radiation related facilities/practices.

The NEA has own internal procedures as well as equipment for radiological emergency. NEA established guidance for first responders, education, drill, exercise, and table top exercise.

1-8) Philippines (Mr. Carl Nohay, Philippine Nuclear Research Institute)

The Philippines, considered as one of the most disaster-prone countries in the world, has long experiences in dealing with, responding to and managing disasters. The country's resiliency to disasters can be attributed to the evolving approach that has been implemented since 1970's by the government.

The National Disaster Coordinating Council (NDCC) was established in 1978 through Presidential Decree 1566 which provided for the establishment of regional, provincial, city, municipal, and barangay disaster coordinating councils.

To recognize the paradigm shift from a mostly reactive disaster response to a proactive disaster risk reduction, Republic Act 10121 or the Philippine Disaster Risk Reduction Management Act was passed into law in May 2010 that paved the way to change the NDCC to National Disaster Risk Reduction Management Council (NDRRMC). The Act provides for the development of policies and plans and its implementation to all aspects of disaster risk reduction and management, risk assessment and early warning, knowledge building and awareness raising, reducing underlying risk factors, and preparedness for an effective response and early recovery.

Aside from natural disasters, the Philippines is not spared against human-induced disasters. For this reason, the National Radiological Emergency Preparedness and Response Plan (RADPLAN) was developed whereby the PNRI took the lead in coordination with the Office of Civil Defense (OCD) and NDRRMC. The RADPLAN aims to establish an organized emergency response capability for a timely, coordinated actions by various government and non-governmental organizations during peacetime nuclear accident or radiological emergency. The RADPLAN describes the general, functional, and infrastructural requirements and obligations of the participating organizations that need to be carried out and defines the concept for integrating the activities of these organizations to protect public health and safety. Nonetheless, the RADPLAN does not alter the authorities or responsibilities ascribed to any agency on a daily basis.

The national response consists of two main components, namely, nuclear response, and non-nuclear response of which the PNRI assumes the responsibility for the coordination of the national nuclear response while the Office of Civil Defense (OCD) takes on the responsibility for the coordination of the non-nuclear response.

The RADPLAN is currently undergoing revision based on the results of the review by the International Atomic Energy Agency (IAEA) Expert Mission, on the lessons learned from the Fukushima-Daiichi accident, and on the recent developments concerned with nuclear security and terrorism.

The PNRI Emergency Plan (PEP) is a document intended to all PNRI personnel in the establishment of response action and capability to an actual or potential radiation related emergencies whether the event arises from technological hazards (e.g. radiological or nuclear, fire, release of toxic chemicals, terrorist attack, etc.) or natural hazards (e.g. earthquake, tornadoes, flood, and other hazards). The PEP also contains the concept of operation based on the alert level and the type of emergency and the manner on how the PNRI emergency preparedness and response has to be maintained.

As part of the Institute's continuing efforts in strengthening the arrangements capabilities of the National Emergency Preparedness Response program, the following activities have been rendered and are being undertaken:

a. the revision of RADPLAN and PEP;
b. the sustainability of the Nuclear Response and Support Center as the command control and communication center;
c. the development of medical response capabilities for radiological emergency in 4 accredited tertiary hospitals in Metro Manila;
d. the conduct of national workshops (e.g. Train the Trainers and First Responders);
e. the participation on the IAEA Emergency Notification Assistance Convention (ENAC) exercise messages such as the IAEA Convention Exercises (ConvEx); and
f. the involvement to emergency response activities including the responses to the Fukushima-Daiichi accident (e.g. personnel monitoring of OFW and media personnel, screening of container vans, environmental monitoring, public awareness seminar, and among others).

1-9) Thailand(Ms. Nanthavan Ya-anant　Thailand Institute of Nuclear Technology)

Ms. Nanthavan Ya-anant, the Thailand project leader presented the Nuclear/Radiological Emergency Preparedness and Response in Thailand. Emergency Planning and Preparedness is part of the licensing process. All licensees including OAP authorized facilities are required to prepare and submit a facility emergency response plan for approval of the regulatory body. The level of preparedness is commensurate to the level of hazards expected in the facility. As a specific regulation in the emergency preparedness and response field, the *"Act of Disaster Prevention and Mitigation"* has been promulgated in 2007.

At the top level there is a national emergency plan for an integrated response to any combination of hazards. *The National Preparedness Plan* which includes the *National Nuclear and Radiological Plan* (NNREP) is part of this "all hazards" plan.

The Bureau of Radiation Safety Regulation, Office of Atoms for Peace (OAP) acts as a National Competent Authority and Technical Support which coordinate to both regulatory bodies and response organizations. The Department of Disaster Prevention and Mitigation (DDPM) is the principle government agency in National Disaster Prevention and Mitigation acts as 1st Responder and/or Decision maker.

1-10) 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 called 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 2,000 MW and the second NPP with capacity of 2,000 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 being reviewed by related organizations. It will be submitted for Prime Minister approval in 2015. Decree on the establishment, organization, duties, powers and coordination mechanisms of the State Steering Committee, Provinces and relevant Ministries on Response of Nuclear and Radiological Incidents will be developed by VARANS in 2014. The draft of the Decree is in the process of reviewing.

A general plan of national radiation monitoring & warning network has been compiling actively. VINATOM will be responsible for building and managing the National Control Center and the Areal Monitoring Stations. Annually, VINATOM reports the environment radiation status to the MOST. DOST of the provinces and central cities will be responsible for building and managing local stations.

This presentation includes the following main contents: Objectives of Nuclear Radiological Emergency Preparedness & Response; National System on Nuclear Radiological Emergency Preparedness & Response; National legislation framework; Activities concerned in recent years; Conclusion and Proposals.

Session II: Discussion on Framework of Consolidated Report on Nuclear/Radiological Emergency Preparedness and Response

Prof. Toshiso Kosako suggested that the consolidated report on Nuclear/Radiological Emergency Preparedness and Response covers 1) fact finding and experience sharing, 2) radiation protection principles, 3) categorization, 4) possibility of international support, and 5) regulations and guidelines. After confirmation of working schedule, member countries were divided into three groups, and each group discussed appropriate contents for the report. Three groups then shared their drafts. The agreed table of contents for this report is attached in **Annex 5**.

Session III: Discussion on challenges faced by FNCA participating countries in the area of

RS&RWM

3-1) Mongolia (Ms.Munkhtogtokh Baatar Nuclear Energy Agency of the Government of Mongolia)

Mongolia has not established a formal indoor radon program. The NRRA is starting to establish radon survey of possible exposure to radon at workplaces and dwellings. A special guidance for measurement of radon in air exists since 1991 in the form of national standard. Permissible level of radon in indoor is 100Bq/m^3. Indoor radon measurements need in houses and flats, which are made of bricks and concrete. Future plans includes Developing of NORM regulations, Upgrading of workplace monitoring and waste management, Strengthening of Regulatory Body/resources, laboratory and equipment, Upgrading education and training system, and Promoting of technical cooperation.

3-2) Japan (Dr. Shoji Futatsukawa Japan Radioisotope Association)

The radioactive materials are regulated by several laws and ordinances according to the purpose of the use. The operation of nuclear power reactor including research reactor and handling of nuclear fuel including nuclear raw materials are regulated by Nuclear Reactor and Fuel Regulation Law. The use of radiation or radioisotope is regulated by Law Concerning Prevention against Radiation Hazards Due to Radioisotopes, etc (Radiation Hazard Prevention Law). The use of radiopharmaceutical as nuclear medicine is regulated by Medical Service Law. So the radioactive wastes generated from the several use of radioactive materials also are regulated by these Laws.

Basically, the radioactive wastes are treated and stored by facilities generating wastes until disposal. The method of the disposal varies according to a radioactivity level of the waste. The low level radioactive wastes having the normal level radioactivity are disposed by Near Surface Disposal Method (Trench Disposal and Pit Disposal). The radioactive wastes of extremely low level are buried without the artificial structure in underground place of less than 50m in depth by the Trench Disposal. The radioactive wastes of cordially low level are buried within the artificial structure in undergrounding place of less than 50m in depth by the Pit Disposal. The low level radioactive wastes having relatively high level radioactivity are disposed by Room Depth Disposal Method and are buried within the article structure in undergrounding place more than 50m in depth. The high level radioactive wastes generated from reprocessing plants are disposed by Deep Geological Disposal Method and are buried within a multiplex barrier in strata more than 300m in depth. Now, these disposal methods are considered or planned. Only the Near Surface Disposal of the low level radioactive wastes generated from Nuclear Power Plants are carried out with concrete pit structure in Aomri-Rokkasyo site by Japan Nuclear Fuel Limited. Radioisotope wastes generated from the use of radioisotopes and radiopharmaceuticals in institute, university, hospital, etc. are collected, treated and stored by JRIA from economic aspect and safety. The radioisotope wastes are to be disposed by JAEA in the future.

Since the Radiation Hazards Prevention Law is revised in 2012, radioactive wastes activated by a radiation generator are regulated. Authority shows radioactive waste activated by each radiation generator in manual concretely. JRIA also collects the radioactive wastes activated by radiation generator in the same way as radioisotope wastes from the use of radioisotopes.

3-3) Bangladesh (Dr. M. Moinul ISLAM Bangladesh Atomic Energy Commission)

Presentation briefly described the Nuclear Power Plant Project in Bangladesh. The perspective plan and national energy strategy of Bangladesh for 2010 – 2021 are also highlighted in the presentation. The Major Milestones in the development of Nuclear Power Programme infrastructure based on IAEA Guidelines, Present status of Rooppur Nuclear Power project, Gradual Improvement and Evolution of Infrastructure development Challenges for building 'Rooppur NPP' are mentioned in the report.

3-4)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 radioactive materials (NORM) and technologically enhanced naturally occurring radioactive materials (TENORM) are generated 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 1,000 MWe each will start operation around 2020.

So far, Vietnam has no national used radioactive sources and radioactive waste storage facility. In November 2011, Vietnam and Russia signed an inter-government agreement on the construction of the nuclear science and technology center to help develop Vietnam's nuclear power program with the investment capital of $500 million. The capital would be loaned by the Russian government at preferential interest rate.

On 5 Mar., 2012, Decision No 265/ QD-TTg, the PM has approved the project "Enhancing the R&D and technical support capabilities for supporting the application of atomic energy and ensuring the safety, security" in order to build up and develop VINATOM to advanced level in the region, take role as an organization for R&D of science and technology as well as a national technical support organization, independent in quality assurance and quality control, ensure safety, security and environment protection for nuclear power development.

Decree on National Policy and Strategy of Management of Radioactive Waste and Spent Nuclear Fuel is being developed by VARANS in 2014. The Draft of the Decree is in the progress of reviewing.

This presentation includes the following main contents: The principal bases for preparation national framework of management radioactive waste; The status of management radioactive waste in Vietnam; The preparation for the first nuclear power plant in Vietnam.

3-5) Australia (Ms.Lynn TAN Australian Nuclear Science and Technology Organisation)

The Australian Federal Government is responsible for radioactive waste disposal in Australia. The authority for the government to establish a national radioactive waste management facility is provided by the National Radioactive Waste Management Act 2012. Prior to enactment of the current legislation, the Australian Government led a number of processes to establish national facilities for the small volume of waste arising from medical, industrial and scientific use of radioactive materials in Australia. This process has been ongoing since the 1970s.

The 2012 Act provides procedural fairness rights for establishing a national radioactive waste management facility. The Act establishes a legislative framework for siting a facility on volunteered land in accord with international best practice. Two volunteer nomination processes are provided for by the Act. The first allows for a Land Council in the Northern Territory to volunteer Aboriginal land on behalf of its Traditional Owners. If this is not possible then a nation-wide volunteer process for siting a facility will be initiated. Under both processes, extensive consultation will be undertaken. The Act will also ensure that the selected site undergoes full environmental, heritage and other approval processes.

The National Radioactive Waste Management Act 2012 upheld the previous nomination of Muckaty Station with provision for volunteer sites, should the nominated site not be pursued or eligible for a repository and ILW Store. This legislation will pave the way for Australia to meet its international obligations to properly manage its own radioactive waste in a purpose-built facility.

3-6) Indonesia (Dr.Budi Setiwan　National Nuclear Energy Agency of Indonesia)

The project is to anticipate the existing radwaste and the possibility of interim storage facility capacity in Serpong Nuclear Research Center (SNRC). BATAN is preparing a location in Serpong Nuclear Area that might be used as a radwaste disposal site for demonstration purpose to show the ability and mastery of technology and safety on radwaste management activities to the public, near surface disposal facility. The facility will be equipped with multibarrier system which consists of engineering barrier and natural barrier system. Through a certain sorting system, some waste packages in the interim storage facility can be moved and placed at the demonstration disposal facility in the future. For that reason all information related to the condition in subsurface around the site need to be taken out to determine soil ability supports facility construction, pattern and direction of groundwater distribution in the environment. The information can indicate possible direction of radionuclide spreading into environment when demonstration disposal facility operates. Field observation and drilling data on SP-4 site were used for preparation of demonstration disposal facility construction, and data on seismicity and volcanic condition, site morphology, lithology and stratigraphy, depth of water table, and groundwater flow direction were collected to meet the environmental safety requirement. From the subsurface data results, the use of shallow foundation system in facility construction is less ideal. Environment of SP-4 site include to the Cisadane watershed, where about 180 m towards the west direction is found a surface water body, Cisalak river. While SP-4 site has groundwater level in 9-8 m depth, its groundwater flow follows hydraulic gradient according to groundwater level contour to the southwest side slopes. Monitoring equipment on the groundwater pathway is needed to monitor the possibility of radionuclides release to the environment later, and the groundwater distribution will be controlled by lithology spread of and site morphology conditions. Based on seismic zonation map of Indonesia, SP-4 site is included in the area with seismic ground acceleration 0.15-0.3 g on the MMI scale ≤ IV. Nearby volcano is mount Salak with harmless status (dormant), located at a distance of > 50 km toward south direction with ash rain or lapili as a potential hazards to the facility.

3-7) Philippines (Mr. Carl Nohay, Philippine Nuclear Research Institute)

At present, radioactive waste generated in the Philippines from the use of radioactive materials in medicine, industry, research and development is being collected, treated, and conditioned by PNRI and at the same time, is provisionally stored at the PNRI Centralized Radioactive Waste Management Facility (RWMF) until a permanent disposal site is developed. Out of 2,920 units of disused sources with radioactivity of 787 TBq stored at RWMF, 905 units with radioactivity of 295 TBq were already conditioned. Aside from disused sources, open sources of solid and liquid types are also stored under the delay-to-decay scheme.

The establishment and maintaining a high level of safety and security at the RWMF demonstrate the commitment of PNRI in ensuring the protection of the health and safety of the general public, and upholding the national interest.

While there are options for the PNRI licensees as to how their disused radioactive sources can be managed safely, the "return to supplier" option is regarded to be the most beneficial in terms of safety and security and the best solution to delay the accumulation of radioactive waste at PNRI.

Due to health risk from exposure to Radon-222 gas, all radium sources were turned over to RWMF for conditioning by placing these sources in stainless steel capsules, then into the lead shield container, and subsequently emplaced inside a concrete-lined drum. Likewise, the spent high activity sources (SHARS), mostly teletherapy sources, were conditioned by a team of experts from NECSA using a mobile hot cell under the IAEA Nuclear Security Fund Program. Both radium and SHARS, are currently stored in Trench B.

The PNRI in collaboration with the Interagency Technical Committee on Radioactive Waste has been undertaking a national project for the final disposal of low to intermediate radioactive waste (LILW) and existing disused sources. The strategy adopted was to co-locate 2 disposal concepts that will address the types of radioactive waste generated. Near surface facility as a solution for LILW and borehole disposal concept for disused sources.

The site investigation and characterization study for the co-location of LILW and borehole disposal facilities is aimed to demonstrate the preliminary technical acceptability of the site based on radioactive waste inventory, the proposed design and engineered features of the facilities, and the suitability of the site characteristics.

The acceptable site which is located north of the Philippines has a relatively flat topped ridge with moderate to gently sloping periphery where both facilities will be located. The site is underlain by highly fractured andesitic volcaniclastics mantled by residual clayery soil and the groundwater in the area is relatively dilute and acidic. Preliminary study also include detailed topography, hydrology and hydrogeology, and conceptual hydrogeological modelling.

Considerations for conceptual design of near surface facility takes into account the requirements set in the Code of PNRI (CPR) Part 23, "Licensing Requirements for Land Disposal of Radioactive Waste", international standards like the IAEA technical documents, the amount and types of radioactive waste for disposal, the climate and geology of the site, the design dose constraint for any release, and the level of access control.

As for the borehole disposal concept, the site-specific conceptual design is derived from the IAEA-TECDOC-1644 Technical Manual on Borehole Disposal of Disused Sealed Sources.

Further to the current activities for the site characterization and conceptual design development, the following are just among the recommended works that have to be done: a) hydrogeochemistry, b) baseline radiometric measurements, c) erosion process, and d) completion of the 140-hectare topographic survey.

The PNRI continues to seek technical assistance from the IAEA for technical advice, training, modelling softwares, and equipment and from the DOST for the next performance and safety assessment study under the Grant-In-Aid.

3-8) Japan (Prof. Toshiso Kosako University of Tokyo)

Mine-related activities had been implemented in Ningyo since U outcrop was found in 1955. Since termination of the activities in 1987, strategies for environmental remediation such as capping construction and ongoing monitoring for the mill tailings pond have been conducted in order to return the land to locals. Also, drainage channels and gabion work are constructed around the capping and at the foot of capping slope, respectively.

Radiation sources causing prolonged exposures includes cosmic, past activities and events, commodities, current practices, accidents, NORM from extractive industries, indoor radon, and terrestrial.

ICRP proposes dose constraints and reference levels for three types of exposure situation, planned exposure situation, emergency situation and existing situation. It is important to consider how to apply this value in case of discussion on uranium waste and what kind of arrangement is possible for residue or uranium mining waste.