Annex 3

Session Summary of
FNCA 2019 Workshop on
Radiation Safety and Radioactive Waste Management

Session 2: Introduction

1) FNCA Achievements 2018-2019 (Mr Wada Tomoaki, FNCA Coordinator of Japan)

The 19th FNCA Ministerial Level Meeting agreed to further accelerate FNCA activities not only by accelerating the existing R&D themes but also by adopting possible future R&D themes of a wide spectrum of interests from the member countries.

the 20th FNCA Coordinator Meeting agreed to begin new phases of the Radiation Safety and Radioactive Waste management with the comments that since almost all countries in the FNCA are planning to construct low-level radioactive waste disposal facilities/long-term storage facilities, this project should assist the member countries with safety improvement related to radiation safety and radioactive management of low-level radioactive waste repositories. Member states are now intensively discussing safety assessment, regulatory and operational system preparation, site selection, and confidence building.

2) Vietnam's Achievements in FNCA Projects (Dr Le Thi Mai Huong, Institute for Technology of Radioactive & Rare Elements (ITRRE))

Through the activities of the FNCA RS&RWM project information and experience exchanges among participating countries, improved understanding and correct information on Radioactive Waste Management has been promoted, especially the technical viewpoint, such as radiation safety techniques, radioactive waste treatment technology, operation of radioactive waste storage and so forth.

According to the evaluation of IAEA experts, up to now, Vietnam has completed one of three main Milestones in the development of a National Infrastructure of Nuclear Power and are prepared for the second milestone: to put Nuclear Power Plant out to contract.

Management and treatment of radioactive waste is one of nineteen infrastructure issues which are necessary to be prepared and completed.

As future tasks, the project of constructing national storage facility of used sealed radioactive sources (borehole disposal system) and NORM/TENORM treatment and management should be tackled.

3) Project Overview and Goal (Prof Kosako Toshiso, the University of Tokyo)

Member countries have various practical issues with low level radioactive waste management, for example some countries have nuclear power plants but some don't, and some country have problems of mining residues but some don't. We therefore need to be more careful when preparing the draft report. Every member country can refer to the scope variation in this report. For the preparation of

"Consolidated Report on Low-level Radioactive Waste Repository", we used a standard format of index consisting of General and Specific parts. But this will be applied flexibly depending on each countries' situation. We need another one year for finalizing this year's "Intermediate Summary". From next year (2020), a new phase will be starting and NORM/TENORM was suggested as the new theme after discussion.

Session 3: Country Report

1) Australia (Mr Duncan Kemp, Australian Nuclear Science and Technology Organisation (ANSTO))

Australia has made minimal progress on the repository over the past year. The main focus of effort has been on the economics of planning the repository, the ownership model and the legal challenges to the public consultation process. I will update the group on those challenges, the result and the impact on the development of the repository. I will also describe the current progress being made on the inventory and how important that is to the whole exercise. As a cheap and relatively well defined task it is vitally important for the definitions of the repository.

2) Bangladesh (Dr M. Moinul Islam, Bangladesh Atomic Energy Commission (BAEC))

In Bangladesh both sealed and unsealed radioactive wastes are generated from the use of radioactive sources in various activities which include nuclear techniques in medicine, agriculture, industry, research and education etc. The regulatory frame work relating to radioactive waste management and brief description of licensed radiation facilities are shown in the presentation. The possible sources of radioactive wastes and the percentage of waste generation from different stakeholders in the country till 2019 are shown in the presentation. Both processed and unprocessed wastes are safely stored at the Central Radioactive Waste Processing and Storage Facility (CWPSF) of Health Physics and Radioactive Waste Management Unit (HPRWMU), Bangladesh Atomic Energy Commission (BAEC).

A project proposal has been submitted for the strengthening of CWPSF under the Government of Bangladesh Annual Development Project (ADP) entitled 'Strengthening of Institute of Nuclear Science and Technology'. In addition, capacity build up of geological survey project of BAEC which includes site selection for waste disposal facility has been submitted to the planning commission for approval. Several challenges for the establishment of radioactive waste repository in the country are briefly addressed in the presentation as well.

3) China (Mr Qin Guoqiang, China National Nuclear Corporation (CNNC))

The Government of the People's Republic of China released a white paper titled "Nuclear Safety in China", on 3 September 2019. This white paper is to introduce China's approach to nuclear safety, elaborate on its basic principles and policies, share the concepts and practices of regulation, and clarify China's determination to promote global nuclear safety governance and the actions it has taken to achieve this.

Politics and practice on disposal of radioactive waste are described in the white paper. China implements the radioactive waste classification of: near-surface or medium-depth disposal of low- and intermediate-level radioactive waste in locations that meet the requirements of nuclear safety, and deep geological disposal of high-level radioactive waste in centralized locations.

There have been two low- and intermediate-level radioactive solid waste disposal sites in operation in China with good safety records.

The efforts for new siting of five solid LILW disposal repositories are being conducted, in provinces where multiple NPPs are located in such as Fujian, Zhejiang, Guangdong, Liaoning and Shandong. One underground laboratory for HLW geological disposal project, which sites in Beishan, Gansu province, has been approved by Chinese authority in May, 2019.

4) Indonesia (Dr Dadong Iskandar, National Nuclear Energy Agency of Indonesia (BATAN))

Indonesia has 3 research reactors (30 MW, 2 MW, and 100 kW) and radioisotopes has been applied in the various fields. In June 2019, the inventory of the radioactive source in use in Indonesia is 6,424 sources, and the number of Disused Sealed Radiation Sources (DSRS) are 3,031 DSRS for Cat. 3-5, and 34 pcs for Cat.1-2. From these DSRSs, 1102 sources have been encapsulated in 174 capsules. Two Interim Storages in CRWT have been filled by the radioactive waste so the disposal has been one alternative. In strategic planning 2015-2019, BATAN will build Near Surface Disposal to dispose low radioactive waste and the project has been postponed. In strategic planning 2020-2024, BATAN has been planning to construct the borehole disposal for DSRS in 2022. The location of borehole disposal will be in the same location with near surface disposal. The required environmental data has been available and the characterization of the site until 100 m soil depth has been done by drilling. Host rock from 50 to 100 m is adequate for borehole, siltstone-claystone with low permeability. Design of borehole is the depth of borehole 100 m with diameter 16.5 cm, and the DSRS container will be put in the depth from 50 m until 100 m. The next activities are to making conceptual and detail designs of borehole and safety assessments during construction until post closure using suitable software.

5) Japan (Mr Saito Tatsuo, Japan Atomic Energy Agency (JAEA))

As this country report of Japan, I'll introduce here 3 topics:

1. Disposal Concept of Radioactive Waste in Japan
2. Conceptual Design of JAEA Disposal Facility
3. Preliminary Safety Assessment for Disposal

In summary, I'll report as follows;

- JAEA is promoting the disposal project of LLW generated from the nuclear energy research / medical and industrial use of radioisotope in Japan.
- JAEA is preparing Conceptual Design of Disposal Facility for the nuclear energy research / medical and industrial LLW.
- JAEA has been developing Preliminary Safety Assessment for disposal.

6) Kazakhstan (Mr Yevgeniy Tur, National Nuclear Center (NNC) of the Republic of Kazakhstan)

The main source of low-level radioactive waste in the Republic of Kazakhstan is uranium industry. Ten years ago Kazakhstan finished a large amount of work on the conservation of former uranium mines, milling facilities and remediation of their territories. Later it was discovered on some sites that protective layers created are damaged due to man-made or natural reasons. At the moment, work is carried out on restoration these layers and organization of proper control and monitoring the sites.

Many solid and liquid wastes were generated during operation of the BN-350 power reactor. There are several projects developed on management of these wastes. The solid radioactive waste treatment project proposed extraction the wastes from trenches, crushing, placing them in barrels, pressing barrels, packing briquettes into reinforced concrete non-returnable containers and cementing, sealing the container and placing containers for long-term storage. During implementation of the project on reprocessing of the liquid metal coolant: a primary coolant was cleaned of cesium by absorbers, a facility for processing the cleaned coolant into a concentrated alkaline solution was built and started, and facility for processing of alkali into a geocement stone, which is suitable for long-term safe storage, is under development.

A long-term storage project is under development. The storage is proposed for contaminated soil of the former nuclear test site’s. Total volume is 100 000 m3. Beginning of the storage operation is planned after 2024.

7) Malaysia (Dr Norasalwa Binti Zakaria, Malaysian Nuclear Agency)

A smart investment is the investment in human capital where human capital can be easily increased through education and training. The LLW repository project in Malaysia was initiated in the year before 2011, but later was given lesser priority beginning year 2013 to give way for the Borehole Disposal Project for disposing of Disused Sealed Radioactive Sources. From 2013 till to date, there has been a big change of staff at the National Radioactive Waste Management Centre due to transfer, retirement, and/or leaving the service. Thus, it is highly critical that the new staff receive proper exposure and acquire tacit knowledge in continuing the national repository project.

The country report highlights the revised planning and timeline of the overall national repository program. During the first phase of the program which ran from 2008-2013, the focus was on the national site screening program. In the second phase (2018-2025), site evaluation and safety assessment will be the focus components. The staff training planning is presented and the main outcome from some of the training held is reported in this report.

8) Mongolia (Ms Uranchimeg Batdelger, Nuclear Energy Commission, Government of Mongolia)

Mongolia is a land-locked country in the Central Asia with large area of approximately 1.5 million square kilometers territory and a population of 3.23 million people. The main purpose of the paper is to assess legal environment of Mongolia for development of nuclear and radiation safety and security. The Nuclear Energy Commission (NEC) was founded in the beginning of 2015 by the Government of Mongolia under the amendment of Nuclear Energy Law. Since then, it has formulated the State Policy for Utilization of Radioactive Minerals and Nuclear Energy and the Nuclear Energy Law, regulatory law of the field. NEC is responsible for developing and implementing the national policy on the exploitation of radioactive minerals and use of nuclear energy, is responsible for coordination activities to ensure nuclear safety and radiation protection, for developing and adopting safety and security regulations, and for licensing of nuclear facilities.

The activities of the General Agency For Specialised Inspection (GASI) is largely focused on the control of: the uses of radiation sources in industry, medicine and research centres, installation of portal monitors to combat illicit trafficking of nuclear and radioactive materials, the exploitation, processing, import, export and transport of radioactive minerals.

The Isotope Center operates the radioactive waste management facility, for the Nuclear Energy Commission is responsible for the safe storage of radiation sources and radioactive wastes and safe transport of radioactive materials in Mongolia. Isotope center is an object of the state protection by Governmental Resolution No 135 by Internal troops operational regulation and organizational procedure for controlling the transport.

9) The Philippines (Ms Kristine Marie Dacallo Romallosa, Philippine Nuclear Research Institute (PNRI))

Although there is capability in managing radioactive wastes in the Philippines, there are safety and security issues that need to be addressed. For instance, there is no national policy and strategy yet on radioactive waste management. There are about 80 drums of cemented DSRS and 165 radium needles need to be reprocessed to comply with the new international and national safety standards. Also, the surrounding area of the waste facility is now heavily populated and urbanized, the security of the radioactive materials is becoming a concern. The demand for nuclear technologies increases over the years hence the volume and the types of wastes generated are also expected to increase. The current facility is only designed for interim storage of the wastes and there is no disposal facility yet. In this presentation, the proposal and current activities being done for the development of a comprehensive radioactive waste management programme in the Philippines will be discussed. Possible collaborations such in the design of processing and storage facilities, will be presented.

10) Thailand (Mr Witsanu Katekaew, Thailand Institute of Nuclear Technology (TINT))

Nuclear and radiation technology in Thailand can be traced back since the utilization of tele therapy radiation source for cancer treatment and diagnosis at Siriraj General hospital in 1935. Since then, this technology has been wildly utilized in various sectors in Thailand, e.g., medicine, industry, research and development and education. Several nuclear and radiation facilities have been developed to serve social and economic needs, and in parallel, radiation safety and security and nuclear safeguard are enhanced and strengthened. Together with those other countries where the utilization of nuclear and radiation technology has played major roles in the society, it is inevitable that radioactive waste is generated and this should be managed safely.

The management of radioactive waste in Thailand is under the control and regulation in compliance with the Nuclear Energy for Peace Act., B.E.2559 (2016). Disposal of radioactive waste is enforced by

Ministerial regulation on radioactive waste management, B.E.2561 (2018). Sources of radioactive waste in Thailand are production and utilization of radioisotopes, research reactor operation, use of sealed radiation sources, decommissioning of nuclear and radiation facility. Types of radioactive waste produced are radioactive contaminated materials, waste from disused sealed radiation source, decommissioning waste, NORM waste and spent nuclear fuel. Sustainable management of radioactive waste, the life cycle assessment and Cradle-to-Grave concept are studied. The end stage for management of radioactive waste is accountable for the safe disposal. Inventory of radioactive wastes in Thailand shows significance in types and volume and this reflects to waste disposal options and sites. Factors concerning preliminary site selection studies were reviewed, e.g., geology, earthquake, rainfall, flooding, and land use. Other factors were also considered, e.g., land-ownership and cost, waste transport, existing and future development of the area. Preliminary study results and perspectives on repository development are discussed.

11) Vietnam (Dr Le Thi Mai Huong, ITRRE)

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. Monitoring the radioactive elements of these wastes, and their burial and management still proceed like those of ordinary production wastes (may take into account the dangers of chemicals...) but not much attention about radioactivity.

Vietnam has no nuclear power plants.

Now Vietnam is postponing the introduction of nuclear power to meet growing demand in electricity and to ensure energy security. The project of cooperation to build a Center for Nuclear Science and Technology (CNEST) was agreed to be implemented in an agreement between the Government of the Socialist Republic of Vietnam and the Government of the Russian Federation (signed on November 21, 2011). The focus of the project is a research reactor with an estimated capacity of about 10 MW.

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 Orientation, Challenges, Plans and Proposals in RWM in Vietnam.

Session 4: Presentation on NORM/TENORM and Disposal of Disused Sources

1) NORM/TENORM (Dr Nguyen Ba Tien, VINATOM)

The management of radioactive wastes NORM/TENORM is currently being investigated by countries around the world, especially IAEA. Vietnam has just started facilities related to NORM / TENORM, their management is still relatively new. The state management Agencies do not have specific policies related to this issue. In this paper, the current situation of waste management in this form is mentioned at mining and processing facilities containing radioactive elements in Vietnam. Specifically, the issue of managing tailings wastes in uranium processing experiments, in mining and processing beach sand minerals, in exploiting and processing rare earth ores and in ZOC (zirconium oxide chloride) production. For the waste produced from the mining industry, oil refining and processing of phosphates, produce acid phosphate processing bauxite: The waste generator and state management agencies have not yet inspected them. Monitor the radioactive elements of these wastes, and their burial and management still proceed like those of ordinary production wastes (may take into account the dangers of chemicals...) but not much attention about radioactivity. Landfills have not invested in methodical construction and are not closely monitored so it often leads to the breakdown of waste reservoir. The report also reports on the possibility of developing this type of waste in Vietnam in the near future and proposes some recommendations for the Ministry of Natural Resources and Environment, the Ministry of Science and Technology on the need to develop a substance management policy on NORM/TENORM in Vietnam to ensure safety for the environment and facilitate businesses to participate in the field of exploration, exploitation and processing of mineral resources containing radioactive elements.

2) Disposal of Disused Sources (Dr Norasalwa Binti Zakaria, Nuclear Malaysia)

Disposal of waste is a sustainable action in the hierarchy of radioactive waste management to ensure protection of people, health and the environment is met. Waste disposal employs a multi-barrier concept similar to the “defence-in-depth” principle as in the nuclear power plant design. One of the methods to dispose of disused sources is the Borehole Disposal Facility. Malaysia, with strong technical assistance from the IAEA, embarked onto a project to develop this facility to dispose Category 3-5 sources in Malaysia. The project started in 2011 and recently, Malaysian Nuclear Agency as the project proponent has successfully attained the license to construct and operate the Borehole Disposal Facility. This presentation highlights the experiences throughout the different phases of project implementation and the next line of actions to be taken to conclude the project.

Session 5: Introduction of MEXT HRD Program and FNCA Activities Related to the RS&RWM Project (Dr Namba Hideki, FNCA Advisor of Japan)

MEXT has promoted two Human Resources Development (HRD) Programs and FNCA Projects. One of the HRD programs, namely Nuclear Researchers Exchange Program (NREP), has started in 1985 and has invited Asian researchers. Now it accepts approximately 20 researchers a year and provides many training courses related to FNCA activities. Another HRD program, namely Nuclear Instructor Training Program (ITP) started in 1996 and it now accepts approximately 80 researchers a year. With regards to the FNCA project activities, Radiation Safety and Radioactive Waste Management project can cooperate with the Nuclear Security and Safeguards project, which is focusing on building an effective international mechanism for nuclear materials security in Asia, and promoting human resource development in nuclear security.

Session 6 & 7: Group Discussion on Consolidated Report

Member countries were divided into three groups and had a discussion on what contents should be incorporated in order to improve the report. The results will be reflected in their consolidated report.

Session 8: Poster Session

Australia:

Australia will be providing a poster about the hot topic of Intermediate level waste storage and disposal. The Australian Government is looking for a solution for all the radioactive waste in Australia, which includes intermediate level. There are several sources of ILW, but the major source is ANSTO. With the low level waste repository design incorporating the storage of ILW, there are many political and social discussion points about storage.

- Is it appropriate to have LLW and ILW together?
- Is it appropriate to move this material twice (double handling) as the waste is transported to the site and then to somewhere else in a few decades?
- As most of it is at ANSTO, is there any benefit to moving it across the country when it is safe and secure now?
- Should the material be stabilised or fully conditioned for disposal?
- How can it be conditioned when we don’t know what the disposal concept is for ILW?
- What are appropriate disposal mechanisms for ILW?
- Is the waste safer or more hazardous than LLW?
- What is the best way to transport ILW?

The poster will state the current state of the debate around ILW in Australia

Bangladesh:

Various R & D activities on radiation applications have been conducted for the peaceful uses of nuclear energy in Bangladesh. Radiation is being utilised in industry, agriculture, and medical treatment purposes. R & D on radiation applications BAEC covers utilisation of the research reactor, radiation processing and technology, application of radioisotopes, food Irradiation etc. To ensure the protection of man and the environment, at present & in future, from the hazards of ionising radiations associated with Radiation Sources and Radioactive Wastes, Health Physics and Radioactive Waste Management Unit (HPRWMU) of BAEC conducting activities in different areas. The activities relating to Environmental Radioactivity Monitoring, Radioactive Waste Management, Secondary Standard Dosimetry Laboratory, Radiation Protection services throughout the country has been depicted in the poster presentation.

China:

Since 1985, when the first nuclear power plant on the Chinese mainland, the Qinshan Nuclear Power Plant, began construction, China has adopted safe and reliable reactor technology, and learned from the experiences and lessons of major nuclear accidents abroad to make safety improvements. After more than 30 years, China has achieved independent design, construction and operational capability in nuclear power, and entered a new stage of safe and efficient development. By June 2019, China had 47 nuclear power units in operation, ranking third in the world, and 11 nuclear power units under construction, ranking first in the world. The first Hualong-1 nuclear reactor in the world is under construction at Fuqing NPP, and it will come into commercial operation in 2020 according to the schedule.

As the capacity of nuclear power plant has been increasing quickly, low- and intermediate-level radioactive waste produced by reactor operation grows quickly in accordance. Timely and safe disposal of solid LILW becomes a key factor to sustainable development of China's nuclear energy. It will be pressing and necessary to speed up in siting and construction of new solid LILW disposal repositories. But in fact, the siting and construction process goes slow, while an important reason is Not In My Backyard (NIMBY).

Indonesia: Study on Inventory and Repository of TENORM Waste from Tin Industry in Bangka Island, Indonesia

Center for Waste Management Technology, BATAN with research grant from Ministry of Research, Technology, and Higher Education has been studying the inventory and repository of TENORM Waste from the Tin Industry in Bangka since the April 2019. There are 4 activities in the tin industry associated with TENORM i.e. mining, washing of tin sand, smelting, and processing of tailings from washing. In mining, tin sand produced from the mining process has high concentration of radioactivity, but the tailing has low radioactivity. Tin sand from mining is washed to increase the tin concentration in the sand. In this step, the tin sand with concentration more than 70% and tailings has been produced. Tin sand and tailing has high radioactive concentration. Tin sand is processed in a smelter which produces tin and slag. Slag has high radioactive concentration, but tin not detected. Tailings from the washing process is reprocessed to produce by product i.e. zircon, ilmenite, and monazite. These by products have high radioactive concentrations. This by-product industry has solved part of the environmental problem from the tin industry, even as it seems there are radiation protection problems for the worker. Slag from smelter is still in problem until now because there is no decision about the disposal. This study has been conducting the slag inventory, the potential site for landfill, the landfill design, and the safety assessment of the landfill. The results will be disseminated to all stakeholders.

Japan:

JAEAs activities of handling huge LLW after Fukushima-Daiichi NPP accident are introduced based on JAEA brochure. In order to reduce the production of LLW, JAEA create database from the experience of radiation monitoring, effect and cost of decontamination of various fields and materials, and geographical data. The database is the core of the Restoration Support System for Environment (RESET). It is a support system for decontamination planning with evaluation of effect of proposed decontamination method. Development of reduction in the disposal amount of existing LLW using classification method, chemical processing or heat treatment are also introduced.

Kazakhstan:

Since the Test Site closure and up until now Kazakhstan in cooperation with international scientific community have accumulated a large scope of information about the current radiological situation at the STS and adjacent territories. The reports revealed all the important spots of radioactive contamination, identified the main pathways and mechanisms for present and potential proliferation of radioactive substances.

The radiological situation does not remain stable; there were identified processes of radionuclide migration which requires regular monitoring of the radiological situation at the STS.

Taking into account the scale of the Site and the variety of tests performed there, the information available about the STS cannot be completely exhaustive but enables us to propose a scientifically grounded plan for further research and practical measures aimed at remediation and reclamation of lands. Implementation of such measures should return the most part of the test site lands to commercial use.

Certain areas at the STS cannot be used now and in the observable future for conventional commercial activities. At the same time, these lands can profitably be used for bringing there enterprises of the nuclear power cycle. Particular need in Kazakhstan exists for disposal of radioactive waste accumulated in the country. It is therefore reasonable to establish at the STS a state facility for processing and long-term storage (disposal) of radioactive waste.

Malaysia: Strengthening radiation safety and facilities of the National Radioactive Waste Management Centre

The National Radioactive Waste Management has been in service for over than 30 years, and for some of its facilities, major maintenance to upkeep the services and safe operating conditions are called for. Around international practices, level of safety is heightened and security measures are imposed at critical installations. Therefore, under the 10th and 11th Malaysia Development Plan, Nuclear Malaysia carried out a program to upgrade the safety and security level of the radioactive waste management facilities as well as to meet the increasing demand for waste management. Some of the projects under this program include construction of a new Interim Store, upgrading the existing Interim Store and upgrading the Low Level Effluent Treatment Plant. It is hoped than the facilities would be able to continue running and providing service for the next 30 years without downtime.

Mongolia:

The purpose of the poster is focus on following: 1) The Nuclear Energy Commission (NEC) of the Government of Mongolia reestablished in the beginning of 2015, under the amendment of Nuclear Energy Law. NEC is responsible for developing and implementing the national policy on the exploitation of radioactive minerals and use of nuclear energy, the responsible for coordination activities to ensure nuclear safety and radiation protection, for developing and adopting safety and security regulations, and for licensing of nuclear facilities. In addition, mention that approved national standards, regulations and guidance. 2) The General Agency for Specialized Inspection (GASI) responsible with largely focused on the control and inspection of the uses of radiation sources and radioactive minerals. 3) The Isotope Center, which operates the radioactive waste management facility, for the Nuclear Energy Commission, is responsible for the safe storage of radiation sources and radioactive wastes and safe transport of radioactive materials in Mongolia.

Philippines: Radioactive Waste Management in the Philippines: Moving Forward

The Philippines, through the Radioactive Waste Management Facility of PNRI continues to safely manage the radioactive wastes generated in the country. Following the experiences from past projects with the IAEA and other member states, works are now focused on the management of Category 3-5 disused sealed radioactive sources (DSRS). From 2018 to date, a total of 87 devices been dismantled, 106 recovered 50 of which have been encapsulated. The inventory of the wastes is also being aligned to the recommendations of the IAEA. The Radioactive Waste Management Registry (RWMR 3.2 Web) of the agency has been adapted and a total of 1,783 waste records starting from 1981 to 2018 have been successfully transferred to the system. Research activities were also conducted particularly in the drum design of DSRS capsules via MCNP calculations in order to maximize the capacity of the storage drum. There are still many challenges ahead however, hence various future projects are being developed particularly in addressing the need for a waste disposal program.

Thailand: Radioactive Waste Management Support Megaport Initiative at Laem Chabang Seaport Thailand

It is an important to the security of the world that cargo shipped through the seaports is screened for hazardous materials that can be used to make a bomb or weapon. In 2005, The U.S. Department of Energy's National Nuclear Security Administrative (NNSA) in cooperation with the Custom Department of Thailand installed radiation portal monitors and alarm communication system under the Megaports Initiative (MI). The radiation detection system started to scan and screen cargo container traffic for special nuclear or other radiation materials in 2007.

Since the radiation detection system operated, a number of cargo containers were confined and investigations were taken to test the emergency practices. Countermeasures on radiation protection together with source searches and radioactive contamination survey techniques played an important role to cope with searching for the source with safely. With regard to Nuclear Energy for Peace Act, B.E.2559(2016), a source found is taken into consideration as radioactive waste. Therefore, radioactive wastes found were confined and more details investigated at the hot zone. Success in scanning and screening the cargo container traffic for radiation material were done several times. Amount of waste due to this task is now likely a significant source of radioactive waste in Thailand. However, the stringent regulatory control and the effective waste management strategy and sufficient facility should be considered to support the MI in Thailand to achieve its mission which serve and help protect the security, human and environment of the world.

Vietnam:

Red mud is the waste from alumina production using Bayer technology, which is considered to be a serious environmental pollutant (NORM). Therefore, the study of red mud reuse and radiation safety assessment has long been considered by scientists. In this paper, a comprehensive method for manufacturing pigments and coagulants from Vietnamese red mud in a closed loop without accompanying secondary wastes: The red mud was dissolved in 3M sulfuric acid at 85 ° C for 2 hours, solution was separated and used as a coagulant, the solid residue was washed, calcined at 700 ° C for 2 hours, then used as a pigment, replacing the iron oxide in an anticorrosive paint for steel and in a coating for road brick. At the same time, to evaluate the applicability of the pigment for paint and coagulants the in waste water treatment with the radiation safety assessment. Pigments for the production of paint have medium particle size of 40-100nm, uniformly distributed and have the main components Fe2O3 ~ 52.4%, used in Alkyl rust-resistant paint with a shear strength of 160 Kg.cm, 3.57 Mpa adhesion and better corrosion resistance. Product quality is equivalent to domestic commercial paint. Coagulants for wastewater treatment are very effective: In particular, for effluent with high COD content, it decreased from 6746 mg / l to 687 mg / l (about 90%), for sewage PO43 decreased from 56.09 mg / l to 21.00 mg / l (about 63%). The coagulant was tested at the Elmich sewage treatment plant of the European Group Elmich Appliances, and the results were achieved by the Vietnamese standard for industrial wastewater.