

Instructor Training Program

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Group Photo of ITC on Environmental Radioactivity Monitoring



FTC on Nuclear/Radiological Emergency Preparedness, Viet Nam

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Develop Instructors in Nuclear Field in Asia

Instructor Training Program (ITP)

ITP is conducted by Nuclear Human Resource Development Center (NuHRDeC), the Japan Atomic Energy Agency (JAEA) since 1996 under contract with the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT). The aims of ITP are to contribute to human resource development (HRD) in the field of nuclear technology in Asian countries and to make nuclear facility located areas in Japan become a hub for international activities. ITP initially started with two participating countries, and currently the number of the countries has increased up to eleven.

ITC, AITC, Seminar, FTC

 **Bangladesh**

 **Indonesia**

 **Kazakhstan**

 **Malaysia**

 **Mongolia**

 **Philippines**

 **Thailand**

 **Turkey**

 **Viet Nam**

Seminar

 **Saudi Arabia**

 **Sri Lanka**

Training in Japan

Instructor Training Course (ITC)

ITC is designed to foster technical instructors concerning three areas: Reactor Engineering, Nuclear/Radiological Emergency Preparedness and Environmental Radioactivity Monitoring. During the three-to-five-week courses in Tokai Village, Ibaraki Prefecture, Japan, participants from Asian countries aim to acquire necessary basic knowledge as instructors through joining lectures by experts, exercises using a variety of equipment, and visits to nuclear facilities.

NEW

Advanced Instructor Training Course (AITC)

AITC is designed for enhancing FTC instructors' quality in three areas: Reactor Engineering, Nuclear/Radiological Emergency Preparedness and Environmental Radioactivity Monitoring. Participants of this course stay in Tokai village, Ibaraki prefecture, Japan for about ten days. They are expected to acquire advanced technical knowledge and skills through the course. The lectures and exercises are organized to learn deeply about themes of each area.

Nuclear Technology Seminar (Seminar)

Seminar is designed to cultivate engineers and specialists in specific areas of nuclear technology. In Tsuruga city, Fukui prefecture, three seminars are held: Nuclear Plant Safety, Nuclear Energy Officials, and Site Preparation and Public Relations. Basic Radiation Knowledge for School Education is held in Tokai Village, Ibaraki Prefecture. Participants of Seminar are invited to Japan for one to four weeks to improve their specialty through tours to nuclear facilities, discussion and interaction with people at nuclear facilities located areas, as well as lectures and exercises.

Training in Participating Countries

Follow-up Training Course (FTC)

FTC is held in each ITC participating country. The ITC participants give lectures in FTC by making the best use of knowledge and experience gained from ITC. They become excellent instructors by the accumulation of teaching experiences year by year through FTC. Two or three Japanese experts are dispatched to FTC to give lectures and technical advice for the establishment of the self-sustainable training courses.

Tsuruga City, Fukui Prefecture

The Wakasa Wan Energy Research Center
Fukui International Human Resources
Development Center for Atomic Energy

Tokai Village, Ibaraki Prefecture
JAEA
Nuclear Human Resource
Development Center

ITC (3 weeks - 5 weeks)

AITC (1.5 weeks)

To Japan

To Japan

From Japan

Dispatch Japanese Experts
(1 week - 2 weeks)

FTC (1 week - 2 weeks)

Nuclear Technology Seminar
(1 week - 4 weeks)

Develop Instructors in the Nuclear Field in Asian Countries

- Establish a nuclear HRD network in Asia
- Build an international activity base at nuclear facility located areas
- Facilitate cooperation between Japan and Asian countries in the nuclear field

The Accumulated Number of ITP Participants (1996~2020)

Instructor Training Course	637
Follow-up Training Course	5690*
Nuclear Technology Seminar	519

* The number of participants is the expected number.
(as of 5 February 2021)

Instructor Training Program in JFY2020

Continue ITP in the Midst of COVID-19 Pandemic

We held three ITCs and a Seminar on Basic Radiation Knowledge for School Education via the Internet. The Asian participants were able to attend the lectures by Japanese experts, connecting from their countries although they could not visit Japan. In addition to the lectures, we presented videos on exercises and facility tours so that the participants could acquire the necessary basic knowledge as instructors.

Reactor Engineering

Period	18 January - 28 January 2021 (8 days)
Participants	76
Course Outline	Participants acquire a wide range of knowledge on nuclear engineering. It is open to engineers, researchers and academic staff in the nuclear field. In JFY2020, the course provided 11 lectures via the Internet. Future ITC applicants and present FTC lecturers were also qualified to participate.



Importance to Learn Basics in the Midst of Difficult Time

ITC on Reactor Engineering consists of a wide range of basic knowledge. We offered lecturers on reactor physics, thermal hydraulics, material engineering, fuels technology and nuclear safety in JFY2020, extracting the most important and basic parts from the lectures of the previous ITCs. Researchers and engineers who wish to participate in ITC on Reactor Engineering in the future can acquire the basic knowledge by completing this course, and they will

understand the lectures and exercises more deeply when they actually join ITC in Japan. The present FTC lecturers were able to brush up on a variety of basic knowledge to improve their skills. It must have been a good opportunity for the participants to refresh their technical knowledge and fully realize the importance of the basics again. We hope they will use the acquired knowledge to instruct reactor engineering from a higher perspective.

Nuclear/Radiological Emergency Preparedness

Period	14 December - 17 December 2020 (4 days)
Participants	74
Course Outline	Participants acquire knowledge and skills on emergency response, in case of a radiation accident inside and outside nuclear or radiation handling facilities. The course is open to engineers, researchers and academic staff in the nuclear field. In JFY2020, the course provided 8 lectures via the Internet. Future ITC applicants and present FTC lecturers were also qualified to participate.



If You Are Dispatched to the Nuclear Accident Site

If a nuclear emergency occurred, first responders are dispatched to the accident site and they must monitor the radiation and rescue people. The dispatched staff also must protect themselves from the radiation unlike other common accidents. The participants studied “Basics of Radiation and Radiation Protection” and “Biological Effects of Radiation” to establish a foundation to be able to cope with the emergency. How much will your internal exposure dose be if you happen to take radioactive materials into your body? To answer such a question, the participants tried evaluating the internal exposure dose by using a calculation code, and were attentively involved in the course. How should we protect ourselves from the radiation as a first responder? The participants learned about the criteria of radiation protection and how to protect themselves by watching videos. They

also learned through practical videos about putting on/off the protective gear and procedure for checking the contamination of the body, actively asking questions. We invited an emergency responder of the Fukushima Daiichi Nuclear Power Station Accident (Fukushima Daiichi NPS Accident) of Tokyo Electric Power Company Holdings, Incorporated (TEPCO) as a lecturer, and the participants learned his experience of environmental radioactivity monitoring around the accident site. We also provided a lecture on the outline of the Fukushima Daiichi NPS Accident and the actual exposure situation, and presented a video of nuclear emergency response drill. Through the lectures and videos, the participants learned the roles and the required attitude as a first responder.



Environmental Radioactivity Monitoring

Period	25 November - 3 December 2020 (6 days)
Participants	51
Course Outline	Participants acquire knowledge and skills on environmental radioactivity monitoring. The course is open to engineers, researchers and academic staff in the nuclear field. In JFY2020, the course provided 10 lectures and 1 facility tour via the Internet. Future ITC applicants and present FTC lecturers were also qualified to participate.



In the radioactivity monitoring of environmental samples, a quite small amount of radioactive materials is measured. For that purpose, we need to collect a large amount of a sample and pretreat it to measure radionuclide by measuring instrument. For example, 60 L of seawater sample should be pretreated for the measurement of gamma ray emitting nuclides. In ITC on Environmental Radioactivity Monitoring, videos of analytical operation were presented, and the lecturer instructed how to treat a large amount of seawater and land water sample. The participants were very interested to see the actual scene of sample pretreatment, which

participants rarely can observe even in the face-to-face trainings. We also presented the participants a video about the facilities which are usually difficult to visit: outdoor radiation monitoring equipment, meteorological observation system to evaluate the atmospheric dispersion of radioactive materials, equipment for pretreatment and measurement of environmental samples. Furthermore, the past ITC participants, now contributing to ITP as FTC lecturers, introduced about FTC in their countries. The participants were able to learn a situation of FTC in the other countries which they cannot know usually.

Unusual Learning Experience Available Online

Basic Radiation Knowledge for School Education

Period	1 February - 4 February 2021 (4 days)
Participants	18
Course Outline	The course objective is to foster human resources who will disseminate correct knowledge of nuclear energy and radiation to the public and students in Asian countries. The course is open to persons in charge of public relations in nuclear research institutes, officials in educational administration of governmental agencies and school teachers. In JFY2020, the course provided 6 lectures, 2 facility tours and discussions via the Internet.



Outreach Activities of JAEA

Seminar on Basic Radiation Knowledge for School Education is designed for participants to learn radiation education in Japan as well as basics of radiation and nuclear reactor. In JFY2020, outreach activities of JAEA were explained by presenting a video of the activity by “Sweet Potato”, JAEA’s public relations team, in the nuclear energy work shop at Terunuma Elementary School of Tokai village. Since evacuation drill for a nuclear accident is also practiced uniquely at the school, the lecturer presented the video of the drill

and explained the difference of response at evacuation between nuclear accidents and other types of disasters. Moreover, a JAEA staff, who actually coped with the communication activity after Fukushima Daiichi NPS Accident, had a lecture on her experience of communicating with the public about radiation at that time. The participants gave us some comments that it was a valuable opportunity for them to know the outreach strategy of JAEA and see children actively learning about nuclear energy and radiation.

Effect of Follow-up Training Course (FTC)

Reactor Engineering

Ms. Cheri Anne Manzano DINGLE

Philippine Nuclear Research Institute (PNRI) ITC 2015 on Reactor Engineering I

Revival of Nuclear Energy as University Subjects

A milestone in the nuclear manpower development in Philippines is the revival of the nuclear energy subject in a master course of the University of the Philippines Diliman in 2019. The subject was offered in the university until the late 1980's but was halted with the retirement of lecturers. The subject now contains a vast range of nuclear science topics from radiation detection to nuclear reactor theory and safety to economics. FTC had a major contribution to both creating the syllabus and teaching the subject. PNRI team that have developed the syllabus and also give lectures on the subject, is composed mostly of past ITC participants and past FTC coordinators.

Global Human Resource

Another notable impact of FTC was that the four past FTC participants pursued a graduate degree in nuclear engineering and nuclear physics abroad. One of them, who is a past ITC participant and also a lecturer of FTC, said that ITC in Tokai and FTC helped him a lot and made the reactor theory subjects easier to understand.

We are looking forward to the rehabilitation of research reactor sub-critical assembly which is under construction. The facility will be used in capacity building for reactor operators, regulators and researchers. We will add lectures on specialized reactor and experiments of the facility in FTC on Reactor Engineering.

With all these endeavors, from a perspective of a PNRI staff, I can say that FTC and ITC helped PNRI team to persevere in capacity building in nuclear and reactor engineering. We thank NuHRDeC, JAEA for their continued support in the nuclear human resource development in our country.



Lecturers of FTC Reactor Engineering, Philippines



Lecturers of FTC on Nuclear/Radiological Emergency Preparedness, Malaysia

Nuclear/Radiological Emergency Preparedness

Mr. Raymond T. YAPP

Malaysian Nuclear Agency (Nuklear Malaysia) ITC 2015 on Nuclear/Radiological Emergency Preparedness

Moving as One Team

FTC has been a crucial platform to connect all related agencies and to build the national plan of nuclear/radiological emergency preparedness in Malaysia. From my experience as a coordinator, I can say, "no one can hold FTC alone". To hold FTC in Malaysia, concerned parties across all levels are involved, namely, Ministry, higher management, implementation teams, instructors and support staff. Moving as one team toward one vision will be the greatest strategy. Our team prefers to train those who are on site during nuclear and radiological emergency as first responders, working for Nuklear Malaysia or related governmental agencies. We want them to learn, to have hands-on practice, to connect and work with different agencies and to apply their knowledge after FTC. This is the same reason why the participants joined FTC.

Education Effect and Future Prospect of FTC in Malaysia

Until today, whenever my team is invited to an event related to nuclear/radiological emergency preparedness, we always see some of the FTC participants take a lead. Our team has realized that the education model from ITP of Japan is great and wonderful. ITP invites participants from Asian countries to participate in ITC and the participants conduct FTC, why don't we use the same model. We have begun to invite past participants to return and share their experiences and to involve in nuclear/radiological emergency preparedness development after FTC. Many of them have more enhanced knowledge now, and some even request us to let them use our FTC training material to train their workers in their workplace. We hope the momentum to build the self-sustainable education system will continue to exist in Malaysia. Not all the agencies will do the same for now, but a small beginning can lead to a bigger success.

Environmental Radioactivity Monitoring

Ms. Phachirarat SOLA

Thailand Institute of Nuclear Technology (TINT) ITC 2011 on Environmental Radioactivity Monitoring

Overview of FTC in Thailand

FTC on Environmental Radioactivity Monitoring has been conducted in TINT since 2014. The objectives of FTC are to train TINT staff as well as employees of competent institutions, in terms of both basic tools that underlie all environmental radioactivity monitoring activities and application to their research or service tasks. FTC on Environmental Radioactivity Monitoring has been gaining a lot of attention from diverse groups of participants both from government and private sectors. So far, the cumulative number of participants since 2014 reaches 124. With the contributions from NuHRDeC, JAEA, the course is successfully organized every year with curriculum arrangement for lectures and exercises. The environmental sampling site is managed and allowed the participants to conduct a real exercise from beginning to end. Lecturers are TINT

staff from R&D Division, Radioactive Waste Management Center, Radiation Dose Measurement and Assessment Section, Nuclear Safety Section and Academic Services Section. Ten of them were previously attended ITC.

Benefits of FTC

Although the participants have different scientific backgrounds, all of them agreed that FTC is an advantageous domestic training course for learning and developing their skills in the areas of environmental radioactivity monitoring including an opportunity to discuss with experts. The activities of FTC on Environmental Radioactivity Monitoring at TINT has provided not only scientific knowledge through a self-sustainable training program but also a promotion for establishment of the international networking and cooperation.

Voice from Past ITC Participants

Mr. Dan Benneth C. MANGULABNAN

Philippine Nuclear Research Institute (PNRI)
ITC 2016 on Reactor Engineering I

Philippines



Benefit of Participating in ITC

Participating in ITC on Reactor Engineering in 2016 is indeed one of the best experiences in my career. It helped me understand more about reactor engineering. It also gave me the opportunity to become a lecturer on FTC held by Nuclear Training Center of PNRI. In that way I was able to impart the knowledge and experience from ITC.

My Experience as Coordinator and Lecturer of FTC

I coordinated the training program for FTC in 2017 and assisted the year after. I have been providing lectures about the introduction to nuclear energy since 2017. Being a lecturer is a great privilege because it is also a perfect way for me to practice my skills and share them with the participants in the most effective way. I feel very grateful to be a part of contributing to the dissemination of knowledge about reactor engineering. I will continue to be active in FTC and also to develop myself to be a good and effective lecturer.

Ms. PUREVBAATAR Gantsetseg

Nuclear Energy Commission (NEC)
ITC 2016 on Nuclear/Radiological Emergency Preparedness

Mongolia



My Experience and Impression of ITC

I had an opportunity to participate in ITC on Nuclear/Radiological Emergency Preparedness in 2016. ITC included various lectures, practical exercises and scientific visits to nuclear facilities. It was a great experience for me to acquire knowledge and skills on nuclear and radiation emergency preparedness and response with international participants. Currently, I am developing the national plan for radiation emergency using what I learned through ITC.

FTC in Mongolia

FTC in Mongolia has been organized since 2014. I have been conducting FTC on Nuclear/Radiological Emergency Preparedness since 2016. The FTC provides lectures on basics of radiation, radiation dosimetry, biological effects of radiation, protective gears and case studies as well as exercises and training on radiation emergencies. The participants were very active during lectures and exercises. After conducting FTC, awareness to develop human resources in the field of emergency preparedness has increased in Mongolia. Also, my teaching skill has improved through sharing my knowledge and experience. I would be grateful to contribute to the continued success of ITC and FTC.

Dr. Ananda Kumar DAS

Bangladesh Atomic Energy Commission (BAEC)
ITC 2017 on Reactor Engineering II

Bangladesh



Importance of Human Resource Development in Nuclear Industry

Human Resource Development is a significant issue for any organization but it is even more crucial for nuclear industry. International Atomic Energy Agency (IAEA) always emphasizes the importance of Nuclear Human Resource Development of its member states. NuHRDeC, JAEA plays an important role in this respect by conducting ITP for many years to support Asian countries.

I was lucky enough to have an opportunity to participate in ITC on Reactor Engineering II in 2017. I learned many new things and greatly improved my knowledge. Presently, I work as a director of the training institute of BAEC, and I can apply the acquired knowledge to train my younger colleagues very effectively. I appreciate JAEA for providing ITC. I hope JAEA will continue the activity and keep being valuable in the future.

Ms. Mine OZGUR

Turkish Energy, Nuclear and Mineral Research Agency (TENMAK)
ITC 2015 on Environmental Radioactivity Monitoring

Turkey



My Experience and Impression of ITC

When I attended ITC in 2015, I was doing my master degree and just finished theoretical lessons. Also, I had been a member of gamma spectrometry laboratory in Turkish Atomic Energy Authority (TAEA) for two years. Those experiences helped me to understand the lessons of ITC. I was really happy to learn all subjects of environmental radioactivity monitoring. The most pleasing experience for me was an exercise on liquid scintillation counting because it was my first time to study the topic. Moreover, it was a great experience to learn the lessons after Fukushima Daiichi NPS Accident since nuclear power plants (NPPs) in my country are under construction. I became more aware of possible risks and threats of the nuclear accident.

My Experience and Impression of FTC

Turkey joined ITP on both Environmental Radioactivity Monitoring and Nuclear/Radiological Emergency Preparedness in 2015, and four members participated in each course. It was a great experience and pleasure for me to organize FTC twice as a coordinator and a lecturer.

In 2017, the first FTC was organized with four past ITC participants for two weeks as a joint course of Environmental Radioactivity Monitoring and Nuclear/Radiological Emergency Preparedness. The curriculum was prepared with the contribution of a Japanese coordinator. We appreciate the big support from JAEA experts during the FTC. The participants were experienced members of TAEA, however, it was the first applied course regarding environmental radioactivity monitoring in our country, so it was very useful for everyone.

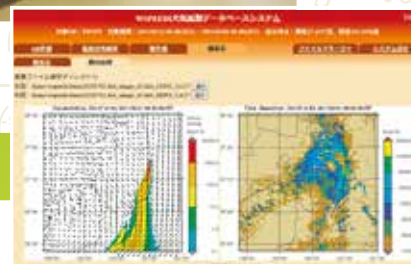
In 2019, the second FTC was organized as the joint course with eight past ITC participants for a week. This time, less experienced TAEA staff participated in FTC and we tried to give most of the lectures by ourselves.

I can truly say that both of our FTCs were gladly accepted and liked by our administrators and participants. I would like to thank JAEA so much for giving us an opportunity to attend ITC and for the support during the FTCs.

※TAEA became TENMAK after reorganization in 2020.

Introduction of Advanced Instructor Training Course (AITC)

AITC will be newly established from JFY2021. Based on the results of survey for themes that each participating country is highly interested in, we are preparing to provide training on specific themes for each course.



Reactor Engineering

Three key themes of reactor engineering, such as neutron physics, shielding technology, and fuel and material engineering, are selected for AITC on Reactor Engineering. Practical exercises on calculation codes for each key theme will be included in the curriculum.

- 1) To acquire the knowledge on neutron physics, the practical training of the Monte Carlo neutron transport code such as MVP as well as the lectures on advanced knowledge on neutron data and neutron activation analysis will be delivered aiming. In addition, lectures on nuclear safety from deep basic concept to probabilistic risk assessment will also be provided.
- 2) To learn the shielding technology used in the field of reactor engineering and its application, practical training of the Monte Carlo simulation code together with lectures on advanced shielding calculation methods for practical usage will be delivered.
- 3) To acquire the knowledge on fuel and material engineering, advanced lectures together with the training of a computer code on material physics will be provided. Furthermore, comprehensive lectures on non-destructive analysis methods, and a lecture and an exercise on innovative methods utilizing neutron resonance spectroscopy will be delivered to deepen and widen the knowledge of current advancements.

Nuclear/Radiological Emergency Preparedness

Two themes were selected considering the situation of constructing NPPs and the influence from neighboring countries.

- 1) To learn the evaluation methods of radioactivity concentration by airborne survey as well as atmospheric dispersion by Worldwide version of System for Prediction of Environmental Emergency Dose Information (WSPEEDI) on the assumption of a nuclear emergency with atmospheric release, the lectures and practical trainings will be conducted. Besides, a group training will be carried out to develop engineers who become able to build the emergency response plan.
- 2) To conduct on site radiation measurements in emergencies, lectures and practical exercises on portable radiation measuring devices as well as a company tour of various kinds of measuring devices will be provided to enhance the knowledge on selecting an appropriate survey meter. A group training for studying an emergency response plan will also be carried out aiming to develop engineers who become able to provide technical guidance in the field of the emergency response.

Environmental Radioactivity Monitoring

Two themes were selected considering the importance of managing monitoring work as well as analytical techniques.

- 1) To develop human resources who can manage monitoring work comprehensively, the evaluation method of the atmospheric dispersion of radioactive materials released from nuclear facilities by model calculations such as WSPEEDI will be provided together with group training on planning, implementing and evaluating monitoring plans considering geographical and social characteristics.
- 2) To develop personnel who become able to manage environmental radioactivity measurement and analytical techniques with higher quality, lectures and practical exercises on various radioactivity measuring devices such as germanium semiconductor detectors and liquid scintillation counters, and group training on evaluating measurement results and quality control of equipment will be provided.



Philippines

Interview

Director

Dr. Carlo A. Arcilla

Philippine Nuclear Research Institute (PNRI)

Professional Background

Dr. Arcilla is an expert in geotechnical engineering and geoscience and has made considerable studies in the field of radioactive waste disposal. He obtained his bachelor of science degree in geology from the University of the Philippines Diliman. Both of his Master's and Doctoral degrees were earned from the University of Illinois in Chicago.

He is actively involved in the activities of the solid science section of the Asia Oceania Geological Society, having served as one of its top-level officers since 2016. He was appointed as a director of PNRI in 2017. He is currently working on the establishment of a cyclotron facility in PNRI for nuclear medicine application and a staunch promoter in establishing Nuclear Power Program in the Philippines.

Q&A

What are Human Resource Development (HRD) Policies in Nuclear Field in Philippines?

The Philippines is aware that sustainability of nuclear applications can only be achieved through a pipeline of highly trained and motivated workforce. It has been collaborating with international nuclear organizations such as IAEA, JAEA and Korea Atomic Energy Research Institute on its effort to develop human resource. PNRI, as the national nuclear authority, implements activities toward nuclear HRD.

The strategic objectives of nuclear HRD program includes:

- To develop competent nuclear human resources in the medical field, industry, research and nuclear energy programs within the framework of Atoms for Peace and Development
- To increase public awareness and public appreciation toward nuclear science and technology application
- To sustain nuclear human resource competence

Strategies for implementation being adopted are:

- Integrating of nuclear topics into the secondary "Science Technology Engineering and Mathematics (STEM)" program
- Integrating nuclear subjects into existing science and engineering education programs in both the undergraduate and graduate levels through implementing a nuclear science/engineering as an elective subject or a core subject

- Establishment of a full graduate program in nuclear science, engineering and/or management in at least one university by 2022
- Effective allocation of professional scientists and engineers on nuclear science and technology

Q&A

How Do You Evaluate ITP, and What Do You Expect from Japan?

The Philippines has been participating in ITC since 2010 and conducting FTC for the past eight years. Those training courses have contributed significantly to building nuclear human resources in the country.

The PNRI has started nuclear engineering graduate program and the chemical engineering undergraduate program in the University of the Philippines Diliman, and the chemical engineering undergraduate program in the Mapua University. PNRI staff who have been trained in either ITC or FTC give lectures in those programs.

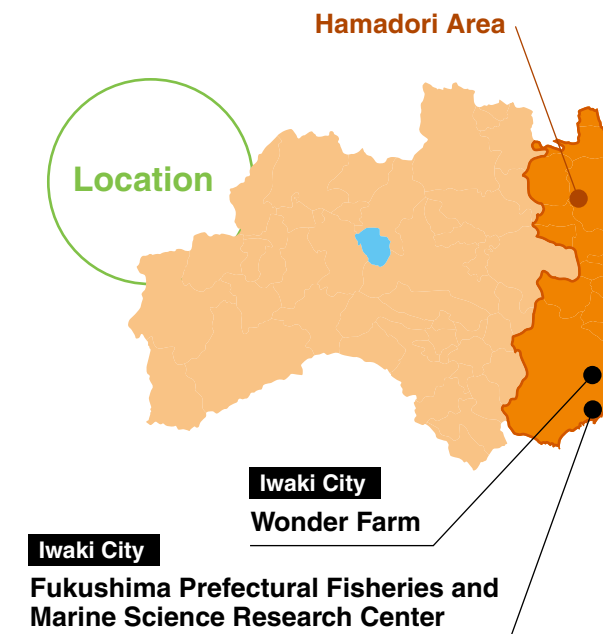
In July 2020, President Rodrigo Duterte issued Executive Order 116 creating the Nuclear Energy Program Inter-Agency Committee (NEP-IAC) and tasked us to study for the adoption of National Position for New Nuclear Power Programs. This raised the level of importance and urgency in our nuclear HRD efforts. PNRI is grateful for Japan's support to meet these challenges.

Current Situation in NPP Sited Areas



Iwaki Maru of Fukushima Prefectural Fisheries and Marine Science Research Center

Fukushima Prefecture



Fukushima Prefectural Fisheries and Marine Science Research Center



Radioactivity Measurement Room of Fukushima Prefectural Fisheries and Marine Science Research Center



Cultivation of Tomatoes in Wonder Farm

We want participants to learn about nuclear related topics including the current situation of

Fukushima. We interviewed the people in facilities where participants will visit in the future.

We interviewed Mr. Kawada, a vice president, and Mr. Kamiyama, a director of Fukushima Prefectural Fisheries and Marine Science Research Center.

Environmental Radioactivity Monitoring in Emergency After the Nuclear Accident

Fukushima Prefectural Fisheries and Marine Science Research Center (formerly known as Fukushima Prefectural Fisheries Experimental Station) in Iwaki city has conducted environmental radioactivity monitoring in emergency on fishery products since April 2011, when it was one month after the Fukushima Daiichi NPS accident. We were surprised to know the difficulties they faced at that time. Mr. Kamiyama told us, "Before the accident, we had not conducted radioactivity monitoring, so we had to start the monitoring tasks from scratch, groping in the dark." At first, radioactivity monitoring on fishery products was not available in Fukushima prefecture, but in the second half of the fiscal year 2011, it became possible at Fukushima Agricultural Technology Center in Koriyama city. The fishery products were pretreated at the former Fukushima Prefectural Fisheries Experimental Station, and then radioactivity of them were measured at Fukushima Agricultural Technology Center.

The monitoring is still continued, and up to 150 specimens in a week are possible to be tested.

Fishing After the Nuclear Disaster

There was no choice but to refrain from commercial fishing in 2011, because the radioactive materials caused by the nuclear accident released into the sea. Radioactivity of the fishery products caught off the coast of Fukushima prefecture was monitored before restart of the fishing. It turned out that the radioactivity of the most products exceeded the standard limit, and only a limited number of species were able to be shipped. For that reason, the fishing was restarted in June 2012, in a restricted way such as targeting at the limited species from the offshore, where fewer influence of the radioactive materials would be expected. It is confirmed by monitoring that the radioactivity concentration keeps going down gradually year by year to the safe level, and the shipment is possible for all the species. Nevertheless, the negative images for fishery products of Fukushima still persistently remains among consumers. In such a situation, the fishing industry of Fukushima has suffered from low level of sales and fish landings for a long time.

Steady Efforts

Fishing industry in Fukushima lost the share to the other areas because they could not ship fishery products for a long time. In 2019, radioactivity was not detectable in 99.8% of fishery products. However, once the share was lost, it is difficult to recover it. On top of that, the fish landings now are almost only 15% of the ones in the previous years of the accident. "It is not easy to restore the credibility which was lost once. Fukushima Prefectural Fisheries and Marine Science Research Center has been announcing the safety of the fishery products of Fukushima through the website, the lectures, and other various events. We will keep monitoring radioactivity steadily aiming at the restoration of fishery industry of Fukushima," Mr. Kamiyama said.

Hiroshi Motoki, a representative director and president of Wonder Farm, the theme park featuring tomatoes in Iwaki city, talked for us.

Impact of the Earthquake and the Nuclear Accident

On 11th March 2011, the east Japan earthquake hit Iwaki city. The earthquake damaged greenhouses and heating facilities in Mr. Motoki's tomato farm. As a result, the seedlings died out. He had to restart growing tomatoes all over again from the new seedlings. Six months after the earthquake, he was finally able to ship the tomatoes. Although the radioactivity concentration of the tomatoes was below the standard limit in Japan, almost one ton of tomatoes remained unsold every day. He did not want to waste his crops grown with great efforts, so he gave them to people at evacuation centers for free. Afterwards, many of the people at the evacuation centers came to him to buy tomatoes, which was the happiest thing ever, he said.

Make His Dreams Come True

He used to be a farmer mainly producing tomatoes. Right after the earthquake, the damages were so devastating that he even thought of quitting the business. However, he received many orders after he started selling online. He recalled, "My longtime dream of running a farmer's restaurant gradually came up in my mind." He launched Wonder Farm, which offers a tomato picking space and has a restaurant. "Our customers can pick tomatoes, eat them and enjoy the taste. It is encouraging for me to see many customers are happily spending their time here," he added.

Revitalize Agriculture in Hamadori Area

Aging population is a big problem in Japanese agriculture. To tackle this problem, Wonder Farm has actively accepted agricultural trainees and let them learn how to grow tomatoes to increase producers for sustaining agriculture. Furthermore, as a branch of Fukushima Innovation Coast Framework, it communicates information about agriculture in the Hamadori area to elementary school students, companies, and tourists, upon requests from Fukushima Prefecture. "Despite the situation of COVID-19 pandemic, we were able to accept many trainees for business training from companies in the Tokyo metropolitan area this year. We keep going on our activities positively," he said.



Radiation Education in Asian Countries

Indonesia



Mr. Adipurwa MUSLICH

National Nuclear Energy Agency (BATAN)
Seminar 2014 on Basic Radiation Knowledge for School Education

Making Good Use of Knowledge and Experiences Gained from Seminar

Nuclear education program has been carried out to introduce radiation in an appropriate manner for young generation for more than ten years in Indonesia. The program was initiated to mitigate resistance to nuclear through educational platform. At the same point, academic communities also need nuclear teaching materials because the topic has appeared in the school education system since 2015. Recently, most of the creators and implementers in nuclear education program are past seminar participants on Basic Radiation Knowledge for School Education. The Seminar has expanded the capability of building nuclear knowledge dissemination activities and accelerated nuclear education program in Indonesia to a new level.

Knowledge and experiences from the Seminar have completed the existing activities in Indonesia such as "Nuclear Goes to School" in which nuclear workers visit schools and teach students, "Nuclear Facility Visit for Students", and "Training for Teacher" to provide basic radiation knowledge and the best practice activities. The seminar was also beneficial to develop teaching materials by using virtual reality, 3D augmented reality, and android education games.

Seminar has positively influenced an Indonesian team to



develop radiation experiments for students. The team has succeeded in developing a simple cloud chamber by using local materials and produced the tutorial video for schools. The Hakaru-kun concept, to use a simple radiation measuring device, is also adopted in experiments for schools. Lecture materials gave so much information about basic radiation for students.

It is worth mentioning that Indonesia is currently involved in the IAEA project "Educating Secondary Students and Science Teachers on Nuclear Science and Technology", and takes part as a reference country in introducing nuclear education methods for students in South East Asia and the Pacific. The outcome of the Seminar has been beneficial for Indonesia in giving international contribution.

Our nuclear education team will continue to develop teaching materials of radiation, which are available through the online platform for the future. Currently, we are working on online radiation calculator and virtual visit, which focus on teacher training to increase their capacity and knowledge.



Sri Lanka



Mr. K.G.Krishan M. GAMAGE

Sri Lanka Atomic Energy Board (SLAEB)
Seminar 2019 on Basic Radiation Knowledge for School Education

Introducing Nuclear Technology with International Cooperation

Sri Lanka has no NPPs, but it is introducing radiation and nuclear technology into medicine, industry, agriculture and security. There is a national requirement for enhancing the radiation literacy among the students who will lead the country in the future.

The most important thing I gained from the seminar on Basic Radiation Knowledge for School Education was the way to introduce radiation and nuclear technology to the young generation in order to make them achieve future goals. With the international cooperation from JAEA and University of Tokyo, we have initiated a comprehensive and a long term project to achieve future objectives.

Human Resource Development in Sri Lanka

We have established Human Resource Development (HRD) programs for different levels of educational objectives. For example, the development of training programs for secondary and high school educators, a self-learning package for the secondary school students, and



awareness programs such as publications and seminars for students and the general public.

Educational Instrument Development (EID) Program was initiated before the HRD program. As proper instruments are necessary for HRD, EID program was merged with the HRD program. With the knowledge and experience gained from trainings and experiences in Japan, the Nuclear Instrumentation Laboratory of SLAEB has developed low-cost and effective instruments which are currently used for the HRD.

As the second step of the EID program, those instruments are introduced to regional science centers as well as to the secondary schools for their practical experiments and demonstrations. Also, these instruments are widely used for various kinds of awareness programs for students and the general public.

We have received so many things from Japan, such as teaching materials, instruments, technological knowledge, and international research and training opportunities. They are vastly used for the success of the endeavors of radiation and nuclear technology in Sri Lanka.

Kazakhstan



Ms. Nurgul KURMANGALIYEVA

National Nuclear Center of the Republic of Kazakhstan (NNC RK)
Seminar 2014 on Basic Radiation Knowledge for School Education

Main Pillars for Education on Radiation Basics

There are four main pillars for education on radiation basics in Kazakhstan. The first one is the curriculum for high school students of comprehensive schools. It includes the standard course of physics covering quantum and atomic physics and optional classes which provide lectures. The second one is Information Center of Nuclear Energy which was established in Nur-Sultan city under cooperation with ROSATOM. The information center engages school children and students by means of lectures, video learning, dosimetric walking tours and so on. The third one is Nuclear Society which develops and publishes the supporting materials. The last one is nuclear related enterprises such as NNC RK, Institute of Radiation Safety and Ecology, and Park of Nuclear Technologies which organize workshops, study tours and excursions for the school children and students. The aims of these educational activities are to disseminate basic knowledge on radiation and nuclear issues among school children and provide them occupational guidance by introducing existing professions in nuclear and radiation related areas.

Benefits Obtained by Seminar

Under the cooperation with JAEA, NNC RK staff members had the opportunity to participate in Seminar on Basic Radiation Knowledge for School Education and acquired valuable knowledge on basic radiation issues such as radiation effects on human body, radiation measurement, and public and media communication. We also had an experience to communicate and do exercises with Japanese high school students. After coming back to Kazakhstan, the past seminar participants of NNC RK give lectures and practical lessons for school children, and take part in NNC RK museum tours as teachers and tour guides. The materials provided by JAEA are usually used as a basis for preparation of lecture materials.



ITP Schedule in JFY2021

Course		Course Period	Announcement	Deadline	Selection Result	Place	Participant
ITC	Reactor Engineering	28 Sep - 2 Nov 2021	May, 2021	Jun, 2021	Jul, 2021	Tokai, JAPAN	8
	Nuclear/Radiological Emergency Preparedness	25 Aug - 14 Sep 2021					5
	Environmental Radioactivity Monitoring	25 Aug - 14 Sep 2021					4
AIRC	Reactor Engineering	12 Jul - 21 Jul 2021	Apr, 2021	Apr, 2021	May, 2021	Tokai, JAPAN	8
	Nuclear/Radiological Emergency Preparedness	23 Jun - 2 Jul 2021					4
	Environmental Radioactivity Monitoring	23 Jun - 2 Jul 2021					5
Seminar	Nuclear Plant Safety	18 Oct - 12 Nov 2021	Apr, 2021	Jun, 2021	Jul, 2021	Tsuruga, JAPAN	10
	Nuclear Energy Officials	29 Nov - 17 Dec 2021	Apr, 2021	Jun, 2021	Jul, 2021	Tsuruga, JAPAN	10
	Basic Radiation Knowledge for School Education	11 Nov - 25 Nov 2021	Jun, 2021	Jul, 2021	Aug, 2021	Tokai, JAPAN	14
	Site Preparation and Public Relations	10 Jan - 19 Jan 2022	Apr, 2021	Jun, 2021	Jul, 2021	Tsuruga, JAPAN	10

*The course period may change in case of unavoidable circumstances.

Message from Director of NuHRDeC



KATO Hiroshi

Director
Nuclear Human Resource Development Center
Japan Atomic Energy Agency

As you know, the COVID-19 pandemic affected the world including Asian countries from the beginning of 2020. Many people passed away, and restrictions were imposed on domestic and international travelling. Consequently, economic activities fell into stagnation. ITP, to which we have made a long-time commitment, had to be postponed or halted for the first time. Despite this difficult situation, we organized the training courses via the Internet, considering the importance of ITP and hoping to secure its continuity.

I believe we will be able to overcome this difficult situation and continue ITP. It is a great honor for us to be able to promote the use of nuclear energy and application of radiation, and contribute to the growth in Asian countries. We look forward to seeing you face to face in no distant future!

ITP Counterparts in JFY2020

Country	Country	Abbreviation
Bangladesh	Bangladesh Atomic Energy Commission	(BAEC)
Indonesia	National Nuclear Energy Agency	(BATAN)
Kazakhstan	National Nuclear Center of the Republic of Kazakhstan	(NNC RK)
	Institute of Nuclear Physics	(INP)
Malaysia	Malaysian Nuclear Agency	(Nuklear Malaysia)
Mongolia	Nuclear Energy Commission	(NEC)
Philippines	Philippine Nuclear Research Institute	(PNRI)
Saudi Arabia	King Abdullah City for Atomic and Renewable Energy	(KACARE)
Sri Lanka	Sri Lanka Atomic Energy Board	(SLAEB)
Thailand	Thailand Institute of Nuclear Technology	(TINT)
Turkey	Turkish Energy, Nuclear and Mineral Research Agency	(TENMAK)
Viet Nam	Viet Nam Atomic Energy Institute	(VINATOM)

Editor's Note

We were sad in JFY2020 because we could not invite participants from Asian countries or spend time with them. However, we conducted the online training courses for the first time, and it was encouraging for us that many people from participating countries joined the courses. It was our great pleasure to be able to communicate with the participants through discussions although they were on the other side of the screen. We expect this year's achievement will lead to further enhancement of the training courses in the near future, and it also will promote friendship when we actually meet participants. We hope that we will be able to distribute the next Newsletter with photos of participants learning earnestly in Japan.



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