

Instructor Training Program

# NEWS LETTER

Vol. **3**  
March 2017



**TOPICS (P12-13)**

## International Cultural Exchange

~ Contribution to nuclear facility located areas ~

# Instructor Training Program

~ Develop instructors in the nuclear field in Asia ~



## Instructor Training Program (ITP)

ITP has been 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 aim of ITP is to contribute to human resource development (HRD) in the field of nuclear technology in Asian countries, and to enable nuclear facility located areas in Japan to become a base of international activities. ITP initially started with two countries, and the number currently increases up to 12 countries.

### ■ Instructor Training Course (ITC) -Training in Japan-

Instructor Training Course (ITC) consists of 5 courses: Reactor Engineering I, II, III, Environmental Radioactivity Monitoring and Nuclear/Radiological Emergency Preparedness. The purpose of ITC is to foster technical instructors in ITC participating countries through 6-8 week courses in Japan where participants have lectures by experts, exercises using a variety of equipment, and visits to nuclear facilities.

### ■ Follow-up Training Course (FTC) -Training in ITC Participating Countries-

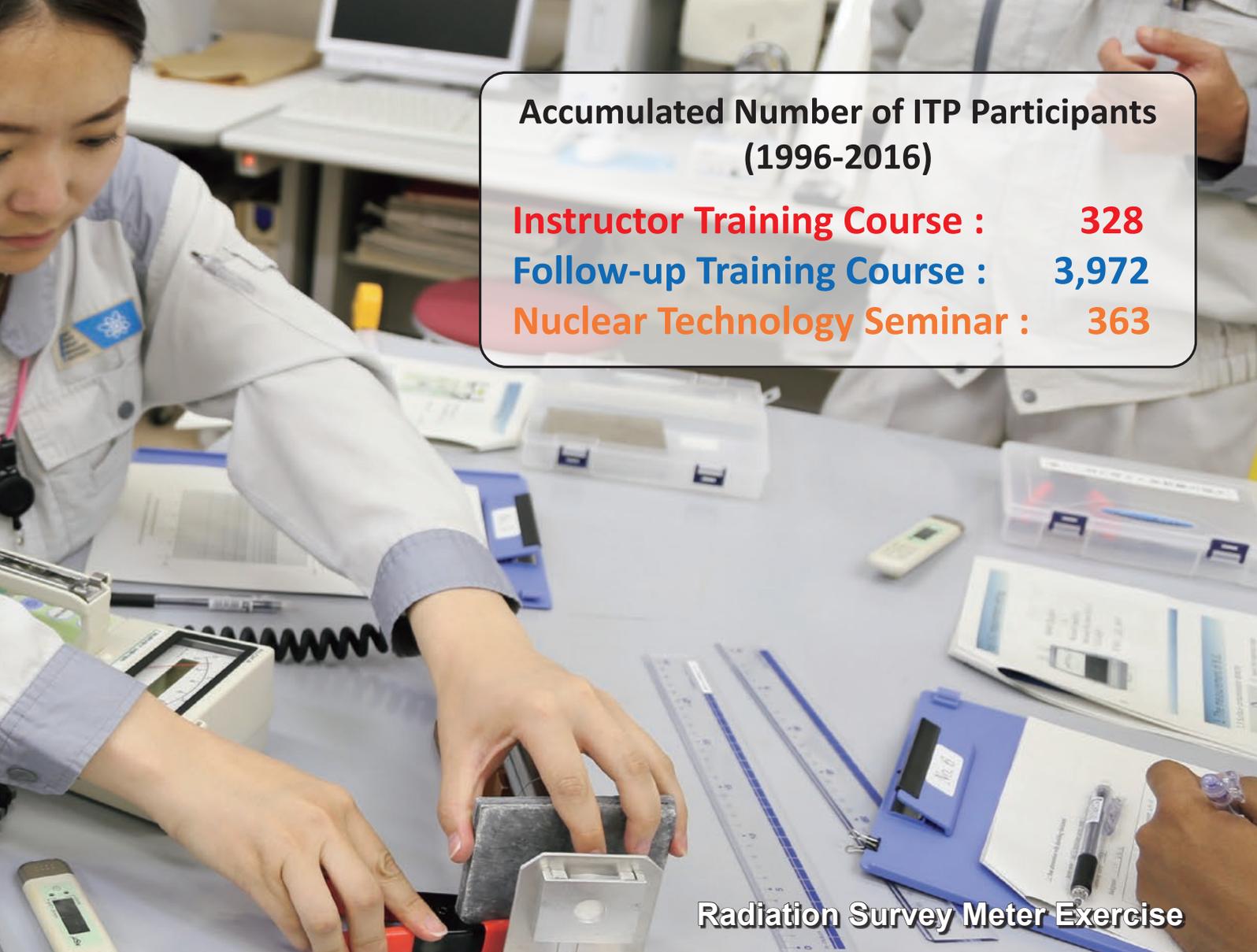
Follow-up Training Course (FTC) is held in each ITC participating country. The ITC participants give lectures at FTC by making the best use of knowledge and experience gained from ITC. They become an excellent instructor by the accumulation of teaching experiences year by year through FTC. Japanese experts are dispatched to FTC to give lectures and technical advice for the establishment of the self-sustainable training courses.

### ■ Nuclear Technology Seminar (Seminar) -Development of Engineers and Specialists-

Nuclear Technology Seminar (Seminar) is designed to cultivate engineers and specialists in the specific area of nuclear technology. The seminar participants are invited to Japan for 1-4 weeks to learn necessary knowledge at lectures and to have experience international cooperation through facility tours and joint events with residents of nuclear facility located areas. In Fukui prefecture, 3 seminars are held, and 1 seminar is held in Ibaraki prefecture.

**Develop instructors in Asian countries**

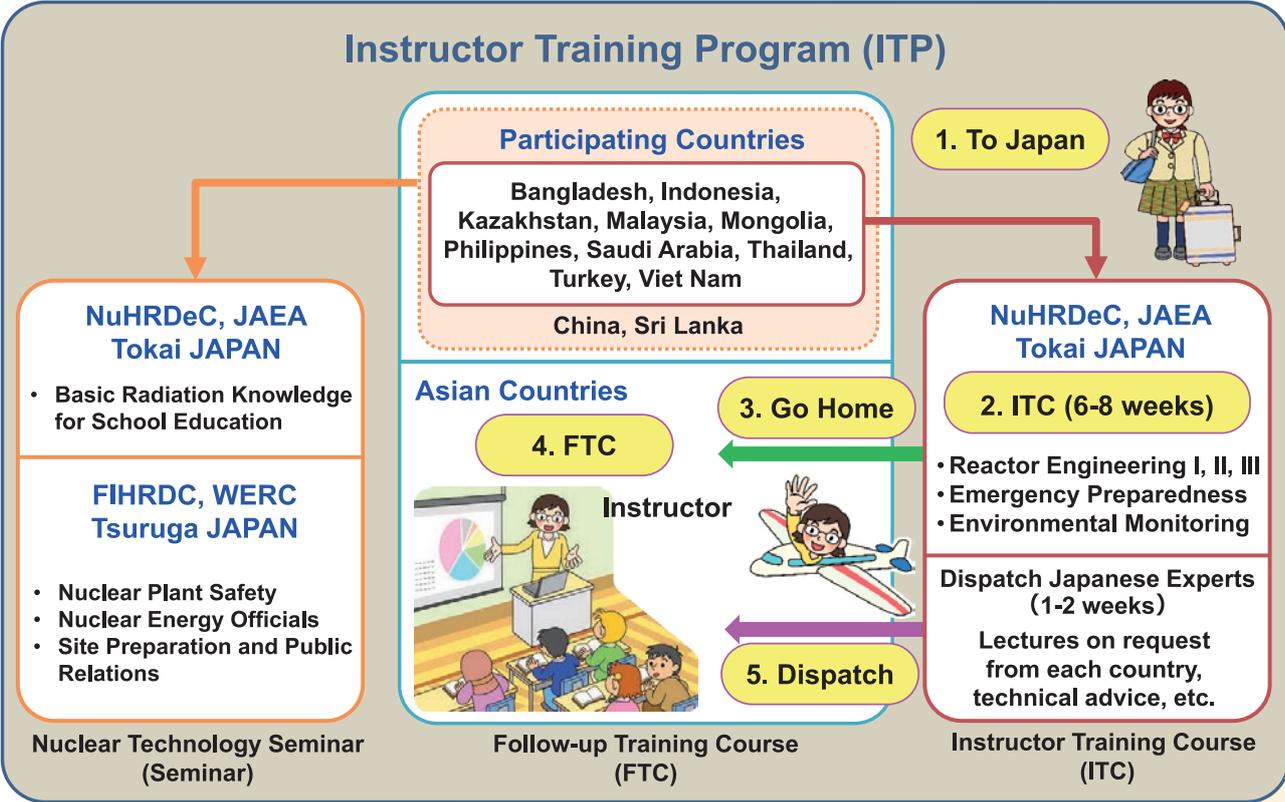
- Establish a nuclear HRD network in Asia
- Build an international activity base in nuclear facility located areas
- Facilitate cooperation between Japan and Asian countries in the nuclear field



**Accumulated Number of ITP Participants  
(1996-2016)**

**Instructor Training Course : 328**  
**Follow-up Training Course : 3,972**  
**Nuclear Technology Seminar : 363**

**Radiation Survey Meter Exercise**



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

# Instructor Training Course (ITC)

~Training in Japan~



JRR-1 Simulator Exercise

## Reactor Engineering I, II, III

Period: 22 August – 14 October 2016 (8 weeks)

Place: Tokai, Ibaraki Prefecture, JAPAN

Participants: 19

### Course Outline:

Participants acquire the wide range of basic knowledge on nuclear engineering and teaching skills as an instructor in their own country. The course is open to engineers, researchers in nuclear related organizations and academic staff. The course consists of Reactor Engineering I (reactor physics), Reactor Engineering II (thermal hydraulics, nuclear fuels/materials) and Reactor Engineering III (nuclear safety), and provides 26 lectures, 16 experiments/exercises and 14 facility tours.

### “Learning Properties of Neutron”

When a neutron is absorbed by a uranium nucleus, the nucleus fissions with a certain probability. In addition to nuclear fission, neutrons have other important properties, and three main properties of neutrons are demonstrated in “Neutron Experiment” at ITC on Reactor Engineering. One of the properties to learn is neutron moderation by collision with hydrogen. The participants set a neutron source which emits fast neutrons and a detector with high sensitivity for thermal neutrons in an acrylic tank, and poured water into the tank. They gradually increased the water level and counted the number of thermal neutrons at each water level. As the water level increasing, the counts increased greatly, particularly above the neutron source. The participants learned that neutrons were slowed down effectively by hydrogen contained in water, and experienced that neutrons were reflected by water. Through this practical experiment, the participants could deepen the understanding of neutron moderation and reflection that they learned at a lecture of reactor physics using equations. They also understood the reason why water is used as a moderator and a reflector for reactors.



## Environmental Radioactivity Monitoring

Period: 20 June – 29 July 2016 (6 weeks)

Place: Tokai, Ibaraki Prefecture, JAPAN

Participants: 8

### Course Outline:

Participants acquire knowledge and skills on environmental radioactivity monitoring. The course is open to engineers, researchers in nuclear related organizations and academic staff and provides 23 lectures, 11 experiments/exercises and 15 facility tours. Part of the course curricula is common to ITC on Nuclear/Radiological Emergency Preparedness.



### “Radiation Survey in Fukushima Prefecture”

As the current situation in Fukushima has drawn attention around the world after the accident at Fukushima Daiichi Nuclear Power Station (Fukushima Daiichi NPS accident), Tokyo Electric Power Company Holdings (TEPCO), a radiation survey is conducted every year as a joint field exercise of ITC on Environmental Radioactivity Monitoring and Nuclear/Radiological Emergency Preparedness. This year, participants measured environmental radioactivity in a decontaminated rice paddy at Naraha town. Despite struggling with mud in the wet paddy, the participants could collect environmental samples of plants and soil using the methods that they learned from the course. Later, the participants measured gamma-rays from those samples and found that a small amount of radioactive cesium was contained in the soil sample. Radiation measurement of a ground surface was also carried out by participants, and they surprised by the result as it was below the annual dose limit for the general public (1 mSv). The last exercise was measurement of a gamma ray spectrum at hot spots. Some participants put up a parasol as the day was sunny and very hot. Seeing colorful parasols in the field with full of greenery, we could not imagine that there was a huge disaster in this area. Through the valuable exercise in the actual contaminated area, the participants could improve the knowledge of environmental radioactivity monitoring.

## Nuclear/Radiological Emergency Preparedness

Period: 20 June – 29 July 2016 (6 weeks)

Place: Tokai, Ibaraki Prefecture, JAPAN

Participants: 7

### 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 in nuclear related organizations and academic staff and provides 22 lectures, 12 experiments/exercises and 15 facility tours. Part of the course curricula is common to ITC on Environmental Radioactivity Monitoring.



### “Facility visit to TEPCO Fukushima Daiichi NPS”

This year, a facility visit to TEPCO Fukushima Daiichi NPS was conducted for the first time since the accident as a joint curriculum with ITC on Environmental Radioactivity Monitoring. Firstly, the outline of the Fukushima Daiichi NPS accident and its countermeasures were explained at TEPCO Fukushima Revitalization Headquarters. After that, participants went on a site tour by bus and saw many facilities, for example, a contaminated water treatment system which is one of challenging issues being addressed at the NPS, reactor buildings of Unit 1-4, and a seismic isolation building in which emergency response and accident management were taken at the time of the accident. As debris was already removed, and treatment systems and equipment for contaminated water were orderly installed inside the site, it was difficult to make a picture of the actual situation at the time of the accident. However, the participants were shocked by facing a largely damaged tank inside the port as remaining evidence of the accident. The current radiation dose was displayed everywhere at the site, and the participants showed a great interest in the dose level of an embankment around Unit 4 which was reduced drastically by decontamination and applying mortar.

This facility visit seemed to be meaningful to the participants as there were many questions and the site tour finished much later than the planned schedule. After the visit, the participants expressed that they want to pass the latest information of TEPCO Fukushima Daiichi NPS to their country.

# Follow-up Training Course (FTC)

~Training in ITC Participating Countries~



Integrated Emergency Response Drill (Mongolia)

## Reactor Engineering

“Special lecture on High Temperature Gas Cooled Reactor - Indonesia”

As part of research and development activities toward the introduction of nuclear power generation, Indonesia has currently carried out a construction project of High Temperature Gas Cooled Reactor (HTGR) with 10MW output in cooperation with International Atomic Energy Agency (IAEA). In order to facilitate the project, National Nuclear Energy Agency (BATAN) requested JAEA to support human resource development in the field, and special lectures on HTGR of JAEA (High Temperature engineering Test Reactor; HTTR) were delivered by a Japanese expert for two days during FTC on Reactor Engineering.

The lecturer introduced the outline of HTTR, its design features and safety, as well as hydrogen production technology using high temperature of about 900°C. In particular, the safety features of HTTR were explained in great detail with test results. For example, a fuel is covered by very hard heat-resistant ceramics, graphite of reactor core has a high melting point and high heat capacity so temperature change is slow at transient conditions, and helium used as coolant is inert gas so it does not cause metal-water reaction to generate hydrogen. These safety features are advantages of HTGR, preventing core melt down and hydrogen explosion occurred at the Fukushima Daiichi NPS accident. Therefore, FTC participants showed a high interest in the safety features and asked many questions in comparison with light water reactor during the lecture. They also commented that it was very useful as we had valuable information and experience regarding HTGR.

## Environmental Radioactivity Monitoring

“ITC past participants actively contribute to FTC - Kazakhstan”

Kazakhstan is the largest uranium production country in the world, and the uranium industry, including mining, conversion, enrichment and fuel production, has become active in the country in recent years. As an introduction plan of nuclear power generation in Kazakhstan has progressed, it is increasingly necessary to foster experts with sufficient knowledge of environmental radioactivity monitoring and radiation protection in case of nuclear-related accidents.

This year, the 5th FTC on Environmental Radioactivity Monitoring was held at Al-Farabi National Kazakh University (KazNU) and Institute of Nuclear Physics (INP). Since many participants were invited to ITC from Kazakhstan, most of lectures at FTC were

## FTC Activities in JFY2016

Country	Course	Duration	Participant
Bangladesh	Reactor Engineering	29 Jan - 16 Feb	2017 12
	Environmental Radioactivity Monitoring	15 Jan - 19 Jan	2017 14
	Nuclear/Radiological Emergency Preparedness	26 Feb - 9 Mar	2017 22
Indonesia	Reactor Engineering	16 May - 27 May	2016 14
	Environmental Radioactivity Monitoring	9 May - 13 May	2016 18
Kazakhstan	Reactor Engineering	5 Sep - 8 Sep	2016 9
	Environmental Radioactivity Monitoring	22 Aug - 26 Aug	2016 15
	Nuclear/Radiological Emergency Preparedness	1 Aug - 4 Aug	2016 5
Malaysia	Reactor Engineering	13 Feb - 24 Feb	2017 15
	Environmental Radioactivity Monitoring	16 Jan - 27 Jan	2017 19
	Nuclear/Radiological Emergency Preparedness	16 Jan - 27 Jan	2017 17
Mongolia	Reactor Engineering	9 Jan - 13 Jan	2017 30
	Environmental Radioactivity Monitoring	10 Oct - 14 Oct	2016 19
	Nuclear/Radiological Emergency Preparedness	22 Aug - 26 Aug	2016 20
Philippines	Reactor Engineering	6 Jun - 17 Jun	2016 20
	Environmental Radioactivity Monitoring	19 Sep - 23 Sep	2016 18
	Nuclear/Radiological Emergency Preparedness	3 Oct - 7 Oct	2016 17
Thailand	Reactor Engineering	26 Sep - 30 Sep	2016 15
	Environmental Radioactivity Monitoring	20 Feb - 3 Mar	2017 15
Viet Nam	Reactor Engineering	20 Feb - 24 Feb	2017 13
	Environmental Radioactivity Monitoring	10 Oct - 14 Oct	2016 27
	Nuclear/Radiological Emergency Preparedness	24 Oct - 28 Oct	2016 21
8 Countries	22 Courses	Total Participants : 375	

covered by the past ITC participants. Ms. Sholpan Nazarkulova (ITC 2012) supervised the whole FTC activities as a course coordinator as well as a lecturer of collecting environmental samples, Mr. Satybaldiyev Bagdat (ITC 2016) gave a lecture on radon in the environment and demonstrated the sampling of river water. Ms. Matveyeva Ilona (ITC 2015) took charge of environmental sample analysis, and Ms. Inesh Kenzhina (ITC 2016) assisted a facility tour and an exercise of soil sampling at INP. Each lecturer made the best use of knowledge obtained from ITC, and Japanese experts were impressed by their great confidence as a lecturer.

As most of FTC participants were relatively young researchers and engineers at INP and students at KazNU, the atmosphere was vibrant and friendly throughout the one week course. It is greatly expected that the experience gained from FTC will be their motivation to advance nuclear energy program in Kazakhstan.

### **Nuclear/Radiological Emergency Preparedness**

#### **“Starting up of FTC as a newcomer – Mongolia”**

A total of 20 trainees, who will be a first responder in nuclear/radiological accidents, were invited from emergency response agencies such as police, medical institutes and army to the 3rd FTC on Nuclear/Radiological Emergency Preparedness. Considering there are no nuclear power plants in Mongolia, the number of participants is quite impressive. The reason behind a relatively large number of participation is a growing awareness of preparation for nuclear accidents in neighboring countries and radiological emergency cases in uranium mining within Mongolia.

A distinctive feature of FTC in Mongolia is an emergency response drill carried out in the prairie. This year, hands-on training was conducted in the prairie such as exercises on radiation protection gears, detection of contaminated points using a radiation source (a small amount of sealed source), environmental radiation measurement, and environmental sample collection. On the other hand, a lack of local lecturers and instructors has been a challenging issue in Mongolia toward the further improvement of FTC. At the moment, Japanese experts support many lectures and exercises in which translation from English to a local language is required and actual lecture time becomes shorter. In order to improve training efficiency, lectures should be given by local lecturers with the local language. Therefore, fostering lecturers and instructors is an urgent issue in Mongolia, and JAEA continues to support self-sustainable human resource development in the country through ITC and FTC.

# Voice from the Past ITC Participants



**Ms. Nurrul Assyikeen Md. Jaffary**  
Malaysian Nuclear Agency (Nuclear Malaysia)  
ITC 2013 on Environmental Radioactivity  
Monitoring

From the participation in ITC, I had learned about radiation and radioactivity monitoring; how Japan conducts environmental monitoring around nuclear facilities and also how to conduct training for sustainability skills and knowledge. I am the person who is working in radioactivity testing, hence the knowledge I gained from ITC has been fully utilized in my current job. I have been involved in FTC since year 2013 as an instructor by giving several lectures and facilitating some practical exercises. Since then, I have fully committed myself to organize FTC in Malaysia. During the 4th FTC in 2015, I was appointed as a coordinator, and organizing FTC with JAEA support gave me direct involvement in developing human resources in the field of environmental monitoring in Malaysia, especially for Nuclear Malaysia, Atomic Energy Licensing Board, Ministry of Health and universities. The FTC syllabus has been adapted to environmental monitoring courses for private sectors organized by Training Unit, Nuclear Malaysia. Other benefits

obtained from ITC and FTC are; learning directly from JAEA experts in the field of radiation and radioactivity measurement, and developing my confidence in sharing the knowledge with my colleagues. I can also identify the gaps between Japan and Malaysia in implementation of environmental monitoring and am always looking for the way forward to eliminating the gaps.



**Dr. Md. Abdul Malek Soner**  
Bangladesh Atomic Energy Commission (BAEC)  
ITC 2013 on Reactor Engineering I

I am working at Center for Research Reactor, BAEC as a Principal Scientific Officer. I am responsible for reactor operation, safety analysis of the BAEC TRIGA Research Reactor (BTRR) and organize different training programs for scientists and students at the reactor facility. I had participated in ITC on Reactor Engineering in 2013. ITC is well organized and is a very effective program for a developing country like Bangladesh. The instructors were very motivated and helpful for learning. This training program gave me a wonderful opportunity to develop a good understanding in the field of reactor physics, nuclear safety and thermal hydraulics. I also enhanced my knowledge through experimental activities and facility visits. I had very few knowledge about thermal hydraulics of nuclear power plant (NPP) but I was able to learn the importance of thermal hydraulic analysis in NPP from this program. ITC also gave me a great opportunity to establish the human network among the ITC participating countries.

After the completion of ITC, I arranged FTC 2014 on Reactor Engineering as a course coordinator in my country as well as delivering five lectures on the topic of reactor physics, reactor kinetics and reactor operation to the participants of FTC 2014 and 2015. I have been invited as a guest lecturer of the Department of Nuclear Engineering, Dhaka University, Bangladesh since 2015. I deliver lectures on reactor theory and experimental analysis to the B.S. and M.S. students one day per week at the university. The theoretical and practical knowledge gained from ITC helps me a lot in teaching these courses.

As Bangladesh government has a strong commitment to implement nuclear power programs in the country, the BTRR is playing an important role in human resources development for nuclear science and nuclear power programs. For instance, more than 200 students of different universities of Bangladesh receive practical knowledge from the reactor facility every year.



### **Mr. Mai Xuan Phong**

**Viet Nam Atomic Energy Institute (VINATOM)  
ITC 2015 on Nuclear and Radiological  
Emergency Preparedness**

I attended ITC on Nuclear and Radiological Emergency Preparedness in 2015. Through the course, I obtained a lot of useful knowledge and skills of radiation and nuclear safety, especially the knowledge and experiences of nuclear and radiation emergency response in Japan in the aftermath of the Fukushima Daiichi NPS accident.

Since 2014, FTC on Nuclear and Radiological Emergency Preparedness has been held at Nuclear Research Institute (NRI) in Da Lat, Viet Nam in cooperation with and support from NuHRDeC, JAEA, and I have been involved in organizing the course since 2015. Now each province in Viet Nam has to build a plan of nuclear and radiological emergency preparedness, and the further development of human resources in the field is necessary through close cooperation between NRI, local provinces and other related organizations. Therefore, we conducted one week FTC this year and invited a total of 21 participants from related organizations including 9 from provincial departments of science and technology. As we received many positive

feedbacks from participants and lecturers, I could say that the course was successfully implemented, and knowledge, skills and experiences I gained from ITC played a huge part as a lecturer and course coordinator in organizing this course.

I have worked for Training Center in NRI since 2010. My current main task is teaching university students in nuclear engineering, nuclear physics, radiation safety, nuclear safety and instructing some relevant experiments. In addition, I am involved in teaching radiation workers from health care sectors and provincial departments of science and technology. Participation in ITC also gave me a great opportunity to improve my professional expertise to meet my job requirements.



### **Ms. Cheri Anne Manzano Dingle**

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

Participation in ITC on Reactor Engineering is very important for the nuclear manpower development in my country. A PNRI project with IAEA was approved in 2016 to construct a sub critical assembly for capacity building, research and manpower development. Schools in the Philippines do not have nuclear engineering courses, thus the manpower must be developed overseas. Since 2012, the Annual Neutron School (ANS) has been conducted, and neutron laboratory was established as part of the capacity building project on nuclear science, in order to educate undergraduate students/trainees about the basics of neutron detection and measurement using neutron sources. After participating in ITC in 2015, I was able to upgrade some of my lectures and experiments and improve the ANS syllabus for a more effecting teaching method.

ITC and FTC have helped us to conduct training on Reactor Engineering in the country. We conduct FTC for young employees of PNRI, Department of Energy and faculty members from high schools, colleges and universities from all over the country. FTC in 2015 focused more on nuclear/reactor physics topics because of the ANS and neutron facility. The experiments also focused more on neutron interactions and reactor calculations using computer simulation. Hopefully, after the rehabilitation of our research reactor as the sub critical assembly through the IAEA project and the increasing number of lecturers for Reactor Engineering with the continued support of JAEA, we may be able to update the FTC syllabus to focus on reactor engineering and safety and conduct real reactor experiments. On the research side, learning from ITC, I was able to input on two research proposals, one on the use of our neutron sources for materials characterization and elemental analysis, and the other on study of a mineral for nuclear waste immobilization. I am very grateful to have the opportunity to go to Japan in 2015, learn more about Japanese culture and the friendly people, visit their wonderful cities, eat authentic Japanese cuisine, meet new friends and expand my nuclear viewpoint. Thank you NuHRDeC and Mabuhay!



# Nuclear Technology Seminar (Seminar)

~Development of Engineers and Specialists~



Facility Visit (KEPCO Operation Support Center)

## Nuclear Plant Safety

Period: 17 October – 11 November 2016 (4 weeks)

Place: Tsuruga, Fukui Prefecture, JAPAN

Participants: 10

### Course Outline:

The course is open to engineers and researchers who are engaged in operation of commercial and research reactors or research and development in the field of radiation application and fundamental nuclear technology in Asian countries. The course provides participants with lectures on safety technology of reactor facilities such as commercial and research reactors in Japan, exercises, nuclear related-facility tours as well as information exchange and discussion on each country's nuclear power generation plan.

### “Facility Tour to KEPCO Ohi NPS and Operation Support Center”

The 10 participants of Seminar on Nuclear Plant Safety visited the Ohi Nuclear Power Station (NPS) and the Operation Support Center of Kansai Electric Power Company (KEPCO).

At the Ohi NPS PR center, the participants had a brief introduction of the NPS, and learned a power generation mechanism of PWR using a one-third scale model of a reactor pressure vessel, a pressurizer, and a steam generator. At the NPS site, the participants observed a fuel pool, a central control room, and a turbine room through the windows. They also saw a seawall, emergency electric generators, large capacity pumps, and watertight doors which have been installed as new safety measures after the Fukushima Daiichi NPS accident.

Later, the participant visited the Operation Support Center and had information regarding education and training for nuclear plant operators offered by utilities. There was an actual scale of plant simulator for operator training, the participants went through a few steps of reactor start-up such as withdrawal of control rods. They also experienced a simulation of the Fukushima Daiichi NPS accident. After visiting two facilities, the participants commented that facility visits offered a valuable opportunity for us to facilitate the introduction of the nuclear industry in our country.

## Nuclear Energy Officials

Period: 21 November – 9 December 2016 (3 weeks)

Place: Tsuruga, Fukui Prefecture, JAPAN

Participants: 9

### Course Outline:

The course is open to governmental officials in nuclear administration. The course provides participants with lectures on a wide range of necessary topics for nuclear administrators such as nuclear energy policy, security administration, safety culture, safety measures and safety management for nuclear facilities, and human resource development. The course also offers tours to nuclear-related facilities as well as information exchange and discussion on each country's nuclear power generation plan. This year, the participants identified major issues toward the introduction of nuclear energy in each country and proposed the solutions based on the knowledge learned from the course. During the discussion, they asked questions each other and actively exchanged their views and opinions.



## Basic Radiation Knowledge for School Education

Period: 7 November – 18 November 2016 (2 weeks)

Place: Tokai, Ibaraki Prefecture, JAPAN

Participants: 16

### Course Outline:

The course is open to officials in public relations and educational administration of nuclear research institutes and governmental agencies, and to school teachers. The course objective is to foster human resources who will disseminate accurate knowledge of nuclear energy and radiation to the public and school students in Asian countries. The course covers basic topics such as an introduction to nuclear energy and radiation, radiation effects on human body, radiation education in Japan, and public information. The course also offers exercises to learn effective methods for teaching radiation knowledge for the public and school students. For example, one of exercises conducted this year was crafting a cloud chamber to observe traces of radiation. When the white traces were illuminated by LED light in the chamber, the participants were surprised that radiation could be seen with the naked eye.



## Site Preparation and Public Relations

Period: 16 January – 20 January 2017 (1 weeks)

Place: Tsuruga, Fukui Prefecture, JAPAN

Participants: 7

### Course Outline:

The course is open to governmental officials in nuclear regulation and public relations. The course offers lectures on laws and assessment regarding site preparation of nuclear facilities, public relations activities, risk communication as well as a visit to a planned construction site of NPP and information exchange and discussion on each country's nuclear power generation plan. As the participants were fully aware of the importance of public understanding toward the introduction of nuclear energy, they listened carefully to Japan's experience of site preparation for nuclear facilities, such as a lecture on coexistence of nuclear power with local municipalities.



# TOPICS : International Cultural Exchange

## ~ Contribution to nuclear facility located areas ~



### Fukui Prefecture: Energy Research and Development Centralization Plan

Although there are many nuclear power plants in Fukui, a lack of clustering of research institutes and human resource development organizations had been pointed out, and cooperation with local industry and technology transfer had not made much progress. Under such circumstances, in March 2005, Fukui prefecture announced an energy research and development centralization plan with the aim of facilitating self-sustainable cooperation between local society and nuclear energy sectors.

The plan consists of four main principles: 1) ensuring security and safety, 2) enhancing research and development functions, 3) developing and exchanging human resources, and 4) creating and developing new industries. Taking advantage of many nuclear reactors in Fukui, practical actions based on the four principals have been taken to utilize nuclear power plants not merely as an energy generation facility but as a comprehensive energy research and development base focusing on nuclear energy.

For the third principle, developing and exchanging human resources, the Fukui International Human Resources Development Center for Atomic Energy (FIHRDC) at the Wakasa Wan Energy Research Center plays a central role in international human resource development in cooperation with relevant agencies in order to contribute to safety technology and human resource development in Asian countries by inviting domestic and foreign trainees. Furthermore, Fukui prefecture have been committed to making various efforts, for example, establishing extensive partnership with universities in Osaka and Nagoya areas, with Fukui university playing a central role, providing training for engineers within the prefecture to improve their skills, and enhancing nuclear and energy education in primary and secondary schools.

Fukui prefecture has also taken various actions for other three principles and have continued implementing of a variety of measures to bring benefits of nuclear energy to local society and to obtain trust from local residents.





## Tokai-mura, Ibaraki Prefecture: Educational Cultural Exchange

As many research institutes and nuclear related facilities are located in Tokai, including JAEA, a large number of foreigners are living here. Therefore, exchange events between local residents and foreigners are regularly conducted. This year, we organized an educational cultural exchange event between local junior high school students and ITC participants as a joint curriculum of ITC on Environmental Radioactivity Monitoring and Nuclear/Radiological Emergency Preparedness. Four students from Tokai Jr. high school and five from Tokai Minami Jr. High school were invited to the event. They gave presentations in English about “Our home town: Tokai”, “Japanese traditional foods”, “Famous things of Ibaraki”, “Ancient city: Kyoto and Nara” and “School events”. Three ITC participants introduced culture, climate and traditional foods of each home country. After that, the students and the ITC participants were divided into several groups and enjoyed a group discussion in English. Hearing laughter from every group, all of them seemed to be having a good conversation on various topics. This event became a good opportunity for the students to utilize English and to develop an international sense through communication with foreigners. The ITC participants could also learn about Japanese culture and have an opportunity to spend time with young Japanese students.



## Mito City, Ibaraki Prefecture: Exercise in Radiation Measurement with High School Students

The 16 participants from 10 Asian countries in Seminar on Basic Radiation Knowledge for School Education had a joint exercise with the 38 students from the Ibaraki prefectural Mito second high school recognized as Super Science High School\* to learn radiation features and how to handle survey meters.

At the exercise, the seminar participants and the high school students worked together to deepen the knowledge of radiation. They measured the level of radiation emitted from natural materials surrounding us and confirmed that the measured value of radiation changes by distance and shielding. At the beginning, the students seemed to be a little nervous but they gradually opened up to the seminar participants and carried out the exercise in relaxed and friendly atmosphere.

After the exercise, the students commented that it was valuable experience for us as we could understand radiation as well as having an opportunity for international cultural exchange. The participants also expressed that we could learn how to use survey meters and had an opportunity to spend great time with Japanese students. The seminar participants are engaged in public relations of nuclear organizations, educational administration, and teachers, the joint exercise was great experience for them to promote the dissemination of nuclear and radiation knowledge in each country in the future.

\*Designated by MEXT with the aim of developing international human resources in the field of science and technology by emphasizing science and mathematics education.



# Interview

**President  
Dr. Tran Chi Thanh**

**Viet Nam Atomic Energy Institute (VINATOM)**

## Professional Background

My career started at Viet Nam Academy of Science and Technology (former National Institute for Science and Technology), and I was involved in many projects relating power generation systems. After that I joined the project in Russia on hydro power plants as a scientific and technical representative of Viet Nam for 9 years. My professional career in the nuclear field started when a pre-feasibility study for the first nuclear power plant in Viet Nam began. Following the completion of the pre-feasibility study, I had an opportunity to obtain PhD in nuclear power safety in Sweden. Since then, I worked for Institute of Energy for three years, and I joined VINATOM in 2012.



## Human Resource Development (HRD) Policies in Nuclear Field

Viet Nam has a strategic HRD policy which consists of three priorities. First priority is developing top experts in each nuclear field such as thermal hydraulics, reactor physics and nuclear chemistry. Second priority is sending excellent students to other countries to study in Master and PhD courses. Third priority is university reforms to establish the faculty of nuclear engineering in Viet Nam. As Head of VINATOM, I carry all management responsibilities on my shoulders including HRD in my institute and also in Viet Nam. Based on the HRD policy, VINATOM needs to take the lead in education programs in nuclear fields using our manpower and facilities. We already made cooperation agreement with some universities in order to strengthen our close relationship in the field of HRD. We actually send our research staff to universities as visiting lecturers, offer use of our experimental facilities, and conduct training courses for students at Nuclear Training Centre of VINATOM.



## Evaluation of ITP and Expectations for Japan

Training courses offered by JAEA are very useful for researchers to start professional career. Many researchers at VINATOM joined ITP and they greatly appreciated for studying and working with Japanese experts. We would like to maximize this opportunity because ITP is one of important steps to realize our three priorities of HRD policy. Over the last 3-4 years, we sent many capable personnel including students to other countries, mainly to Japan, South Korea and Russia. We also seek more opportunities for joint researches with Japanese institutes and hope that Japan can offer long-term training programs for researchers to enhance their expertise in the field of nuclear energy.

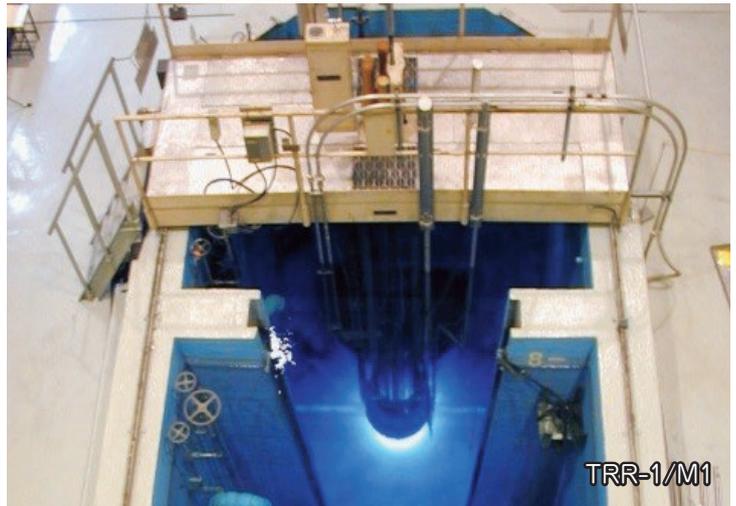


# Research Reactors in Asian Countries



## Thailand

The first criticality in Thailand was achieved at Thailand Research Reactor-1 (TRR-1) in October 1962. TRR-1 was a swimming pool type reactor with thermal power up to 1 MW. The reactor employed highly enriched uranium fuel and utilized light water as moderator and coolant. The reactor core was composed of MTR-type (plate) fuel elements and graphite reflector elements arranged in rows on a grid plate approximately 6 meter below the water surface. The cooling water was circulated through the core by natural convection.



In 1975, TRR-1 was shutdown for core conversion. The highly enriched uranium plate core was replaced by low enriched TRIGA rod-type fuel. The newly installed reactor has been operating since November 1977. The reactor was renamed to Thai Research Reactor-1/Modification 1 (TRR-1/M1). Initially, the TRR-1/M1 was loaded with 20% enrichment fuel with the uranium content of 8.5 wt.%. Due to relatively heavy reactor use, the higher loaded TRIGA fuel with enrichment of 20% and the uranium content of 20wt% containing erbium as a burnable poison was introduced into the core in 1980. Since the TRIGA fuel is used in the present core, the design and operating characteristics and the safety considerations of this reactor are very similar to those of a typical TRIGA reactor. TRR-1/M1 can operate up to 1.2 MW. The purpose of facility includes: (1) produce radioisotopes for medical, industrial, and agricultural, (2) conduct beam experiments, neutron radiography, prompt-gamma neutron activation analysis (3) conduct applied research and technology development in the nuclear or other fields, (4) provide training and study on the fundamental principles of the reactor and its operation, and (5) provide a neutron source for neutron activation analyses.



## Turkey

There are two research reactors in Turkey. The first research reactor was installed in Çekmece Nuclear Research and Training Centre (ÇNAEM) in İstanbul. ÇNAEM commissioned a 1 MW research reactor (TR-1) in 1962 for research and isotope production for industrial and medical purposes. It was operational from 1962 to 1977 and has now been dismantled. A pool type 5 MW TR-2 reactor was later built in the same building and had been operated at 5 MW between



1984 and 1994 for irradiation purposes, and operated at low power levels between 1995 and 2009 due to updating seismic evaluation studies of the reactor building. In 2013, the project on strengthening the reactor building was completed. The reactor uses low enriched uranium plate type fuel and is operating for isotope production, education, training and research. The second research reactor, TRIGA MARK II reached its first criticality on 11 March 1979 in Istanbul Technical University (ITU). It is a pool-type, light water cooled and graphite-reflected reactor with low enriched uranium fuel. It is operating for education, training and research. ITU TRIGA MARK II Reactor is capable of steady state operation at power levels up to 250kW or pulsing mode operation where powers as high as 1200MW are achieved for about 10msec.

● ITP Schedule in JFY2017

Course		Course Period	Announcement	Deadline	Selection Result	Place	Participant
ITC	Reactor Engineering I, II, III	21 Aug - 13 Oct 2017		Apr, 2017	Jun, 2017		18
	Environmental Radioactivity Monitoring	19 Jun - 28 Jul 2017	Mar, 2017	Apr, 2017	May, 2017	Tokai, JAPAN	6
	Nuclear/Radiological Emergency Preparedness	19 Jun - 28 Jul 2017					8
Seminar	Nuclear Plant Safety	16 Oct - 10 Nov 2017	Apr, 2017	Jun, 2017	Jul, 2017	Tsuruga, JAPAN	10
	Nuclear Energy Officials	20 Nov - 8 Dec 2017	Apr, 2017	Jun, 2017	Jul, 2017	Tsuruga, JAPAN	10
	Basic Radiation Knowledge for School Education	6 Nov - 17 Nov 2017	Jun, 2017	Jul, 2017	Aug, 2017	Tokai, JAPAN	14
	Site Preparation and Public Relations	15 Jan - 19 Jan 2018	Apr, 2017	Jun, 2017	Jul, 2017	Tsuruga, JAPAN	7

(Total Participants : 73)

● Interview with Director of NuHRDeC

**Q A** Future Prospects of ITP

ITP has actively contributed to human resource development in the ITP participating countries. A good number of instructors with a certain level has developed in some countries where offering a higher level of lectures in ITC becomes more necessary to enhance each local instructor's expertise. On the other hand, the number of instructors is not sufficient enough in newly joined countries where offering a training course with a relatively wide basic knowledge is still important. Therefore, we will try to provide more valuable training that meets the needs and level of each country.

**Q A** Japan's Responsibility in Asia ~

Japan has always opened to outside influences. In the 8th century, Ganjin, a chief priest of Daimyo-ji Temple at Yangzhou, visited Japan like a FTC expert to introduce the Buddhist which was the latest cultural trends at the time. There is an obvious difference in appearance between a Chinese and Japanese pagoda. A Japanese one is designed with the wider eaves due to heavy rainfall. The original design was adapted to Japan's climate, and Japanese pagodas can keep its beautiful appearance for a long time. We also need to teach not only technology but the importance of wisdom to adapt learned technology to the situation of each country.



**Dr. Tomotsugu Sawai**  
 Director  
 Nuclear Human Resource Development Center  
 Japan Atomic Energy Agency

● Editor's Note

To select photos for this newsletter, we looked through hundreds of photos taken during courses. Every photo showed a beautiful smile or a serious face of participants, and it reminded us of every single one of them. That was the moment for us to feel joy and proud of being involved in ITP. The new fiscal year will start soon in Japan, we are already excited about meeting next participants. The first issue was published two years ago, and we change the content every year. In this issue, the design was totally renewed, and international activities conducted at ITP were introduced as highlight topics. A joint exercise by high school students and participants has already conducted three times. We organized an international cultural exchange event with junior high school students for the first time this year. Both students and course participants said that it was useful and enjoyable time. We will therefore continue to organize such activities to encourage young generations in nuclear facilities located areas to be an internationally-oriented person.

● ITP Counterparts in JFY2016

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

