

Instructor Training Program

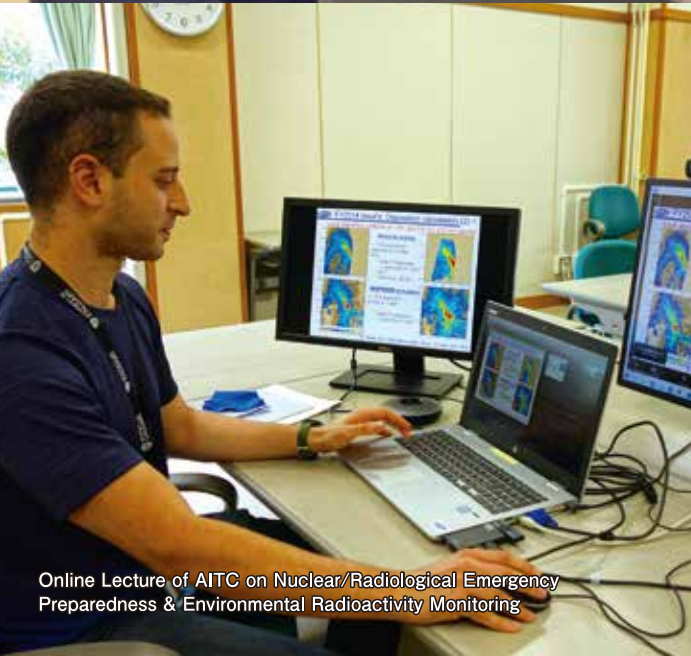
NEWS LETTER



Vol.
8
March 2022



Radiation Measurement Exercise for High School Students in Seminar on Basic Radiation Knowledge for School Education



Online Lecture of AITC on Nuclear/Radiological Emergency Preparedness & Environmental Radioactivity Monitoring

CONTENTS

TOPICS	Advanced Instructor Training Course08
	Current Initiatives in NPP Sited Areas12
■	Develop Instructors in Nuclear Field in Asia02
■	Instructor Training Course04
■	Effect of Follow-up Training Course06
■	Nuclear Technology Seminar10
■	Interview14
■	Education on Basics of Radiation in Asian Countries15

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.

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-mura, 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-mura, 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-mura, 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.

※In JFY 2021, every event was provided via the Internet.

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 give lectures and technical advice for the establishment of the self-sustainable training courses.

※In JFY 2021, the lectures and technical guidance by the specialists were provided via the Internet.

Tsuruga City, Fukui Prefecture

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

Tokai-mura, Naka-gun, Ibaraki prefecture

The Japan Atomic Energy Agency
Nuclear Human Resource
Development Center

ITC (3 weeks - 5 weeks)

AITC (1.5 weeks)

To Japan

From Japan

Dispatch Japanese Experts
(1 week - 2 weeks)

FTC (1 week - 2 weeks)

To Japan

Nuclear Technology Seminar
(1.5 weeks - 4 weeks)

ITC, AITC, Seminar, FTC

Seminar



Bangladesh



Malaysia



Thailand



Saudi Arabia



Indonesia



Mongolia



Turkey



Sri Lanka



Kazakhstan



Philippines



Viet Nam

The Accumulated Number of ITP Participants (JFY 1996~2021)

Instructor Training Course	686
Advanced Instructor Training Course	36
Follow-up Training Course	5941*
Nuclear Technology Seminar	567

*The number of participants is the expected number. (as of 1 February 2022)

Instructor Training Course (ITC)

Reactor Engineering

Period: 27 September - 28 October 2021 (5 weeks)

Participants: 18

Course Outline Participants acquire a wide range of knowledge on nuclear engineering and the skills to disseminate the knowledge as a lecturer. The course is open to engineers, researchers and academic staff in the nuclear field. In JFY 2021, the course provided 18 lectures, 1 exercise, 1 facility visit and 1 group work via the Internet.



Neutron Experiment: Exercise Provided via Internet

Practical exercise is one of the subjects which faces difficulty to be implemented in online trainings. However, because that is an effective method to understand physical phenomena, we tried providing it online. The neutron experiment was selected as it has been well received among participants every year. In the experiment, the neutron source which emits fast neutrons and a detector which detects slow neutrons are set in the middle of a water tank. Then, by changing the water level, participants observe how the counts of slow neutrons change and study the neutron slowing down effect of water. We produced a video of the experiment in which JAEA staff played the roles of a participant and an instructor. We shot the video with two cameras, checking and editing simultaneously. In the video,

whole view was shown until water began to be poured and the start-measurement button was pushed, then the display window of detected number was zoomed up. In this way, we produced it successfully to give the effect as if the experiments were done in front of participants.

On the day of the exercise, we played the video while sometimes pausing it for explanation, predicting the measurement values and understanding the result. Consequently, we achieved interactive communication in the exercise. The reactions toward the online exercise were so favorable that some participants commented in the questionnaire that it was the most interesting part of the course.



Nuclear/Radiological Emergency Preparedness

Period: 30 August -16 September 2021 (3 weeks)

Participants: 16

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 JFY 2021, the course provided 15 lectures, 9 exercises and 2 facility visits via the Internet. Some parts of the curriculum were joint classes with ITC on Environmental Radioactivity Monitoring.

Learn Evaluation and Protocols for Emergency Response

When an accident occurs during the transportation of radioactive materials, emergency responders are dispatched to the scene and conduct environmental monitoring as well as rescue operation. Not like other general accidents or disasters, they need to protect themselves from radiation. Therefore, the participants learned the idea of emergency preparedness, knowledge on the features of nuclear accidents and techniques to deal with the situation. The technical documents of International Atomic Energy Agency (IAEA), *Generic Procedures for Assessment and Response during a Radiological Emergency* (IAEA-TECDOC-1162), was used as a reference to learn and discuss the functions of emergency managers, on-scene commanders and first

responders. Moreover, Japan's experience of emergency response based on the lessons from Fukushima Daiichi Nuclear Power Station Accident (Fukushima Daiichi NPS Accident) of Tokyo Electric Power Company Holdings, Incorporated (TEPCO) was introduced, and then a video of nuclear energy disaster prevention drill was presented. From these contents, the participants were able to study the roles and responsibilities of emergency responders. Also, the participants watched another video of the integrated emergency drill assuming an accident during the transportation of radioactive materials, and they discussed the first response which should be done at the scene in detail to deepen their understanding.

Environmental Radioactivity Monitoring

Period: 30 August - 16 September 2021 (3 weeks)

Participants: 15

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 JFY 2021, the course provided 13 lectures, 6 exercises and 2 facility visits via the Internet. Some parts of the curriculum were joint classes with ITC on Nuclear/Radiological Emergency Preparedness.



Learn Radioactivity in the Environmental Samples

To monitor radioactivity in the environment, a proper instrument should be chosen from various kinds of detectors according to properties of a target sample and a radionuclide. The participants worked on exercises of learning measurement principle of a detector and radioactivity calculation method, in order to properly calculate and evaluate radioactivity in the environment sample. First, they studied the measurement principles of detectors for tritium which emits low-energy beta rays and gamma emitters. Next, they learned calculation method for radioactivity concentration, which usually tends to become a

black box because of automated calculation with computer software. Based on the data of actual environment monitoring, they worked on exercises on radioactivity calculation by hand without a computer software. They used the knowledge gained from the course to calculate radioactivity, exchanged opinions to work on exercises, made a presentation and discussed on the exercises. Although each participant had a different area of specialty, they were able to deepen their understanding of areas which were unfamiliar to them.

Comments from ITC Participants



Reactor Engineering

Tenaga Nasional Berhad
Mr. Shamsul Amri Sulaiman

ITC 2021 on Reactor Engineering is indeed a commendable effort by JAEA despite all the limitations imposed by the online system particularly on the experimental exercise. On a personal note, I encountered some difficulties in juggling my time between the lectures and my work since my work is related to operation and maintenance. Nevertheless, I really enjoyed myself listening and learning from the experts on each subject. I learned a lot from each distinguished instructor. More importantly, I am glad to meet new friends from the other nations and JAEA's instructors.



Nuclear/Radiological Emergency Preparedness

Nuklear Malaysia
Ms. Noor Ezati SHUIB

All the lecturers were very well experienced in their teaching topic. I got so much knowledge and information from them. The secretariats were very helpful and assisted participants very well. All the information shared during the course from the lecturers and participants will be very useful to improve all related topics in our country.



Environmental Radioactivity Monitoring

Philippine Nuclear Research Institute
Mr. Antonio III Caldea BONGA

Overall, taking the online course was a really good experience for me. I was able to refresh, update my knowledge of environmental radioactivity monitoring, and learn some topics I was less knowledgeable about, such as liquid scintillation counting. I was also able to know the practices of the other countries with regards to environmental radioactivity monitoring through the invited lecturers and the other participants.

Effect of Follow-up Training Course (FTC)



FTC Coordinators Share What They Do to Improve Training, Their Situation in 2021 FTC

FTC on Reactor Engineering, Indonesia

Reactor Engineering

National Nuclear Agency (BATAN), National Research and Innovation Agency (BRIN)
Completed ITC 2012 on Reactor Engineering III

Mr. Deswandri



Indonesia

Importance of Human Resource Development, Overview of FTC in Indonesia

Although installation of nuclear power plants (NPP) has been considered as the last option in Indonesia, it is a very logical choice based on the fact that fossil fuels, which have been the main source of electricity generation in Indonesia, are running low. When Indonesia has decided to build NPP, the readiness of competent human resources will be very important for the success of the installation. In order to develop human resources related to nuclear reactor engineering, the Center for Education and Training, BATAN has been organized FTC on Reactor Engineering for two weeks since 2010. To make the training more effective, it has been coordinated at the Research and Technology Center for Nuclear Reactor Safety, BATAN since 2016.

Most of the FTC lecturers are senior staff involved in research activities on the related areas for a long time. Some of the lecturers are past participants of ITC. As for difficult and important topics, BATAN asks for the support of JAEA to dispatch lecturers. FTC in Indonesia has two programs which are held alternately. One is for reactor physics and reactor materials, and the other is for reactor thermohydraulics and safety. FTC is classified as a basic level training in the training scheme at BATAN and regarded as a very important training to provide junior staff with knowledge about reactor technology and safety.

Continue FTC During the Pandemic

With the cooperation and assistance of JAEA, the FTC in Indonesia has been successfully implemented every year without any obstacles, including during the COVID-19 pandemic in the last two years. Through questionnaires, the participants always gave a very good response, especially regarding the quality of the materials and lecturers.

Even though lectures can run well, it is felt that online exercises are less effective because of the lack of interaction when compared to face-to-face methods. To improve the situation, they were carried out face-to-face in 2021 using strict health protocols. We hope that the COVID-19 pandemic will end soon so that we will be able to see participants in person next year.



Non-Destructive Testing Experiment



Nuclear/Radiological Emergency Preparedness

National Nuclear Center of the Republic of Kazakhstan (NNC RK)
Completed ITC 2021 on Nuclear/Radiological Emergency Preparedness

Ms. Yevgeniya Mustafina



Kazakhstan

Necessity to Learn Proper Means for Nuclear/Radiological Emergency

Emergency responders are the first to arrive at the nuclear/radiological accident scene. Response to nuclear/radiological accidents is largely similar to the one to any accidents involving hazardous materials. However, in case of accidents with other hazardous substances, human senses, such as eyesight and hearing, can help identify a hazard while ionizing radiation is not detectable by the human senses. Therefore, specialists must be provided with necessary means of detecting a radiation hazard and means of informing the public on required actions to be taken.

Wide Range of Learning from Basic Physics to Practical Topics on Radiation

FTC in 2021 was held via the internet. In this course, participants studied basics of radiation physics including types of ionizing radiation and their interactions with substances. The participants familiarized themselves with radiometric and survey meters designed for measuring energy characteristics of ionizing radiation and also with spectrometric equipment to identify radionuclides. Furthermore, participants learned health physicists' first response actions in case of a radiological emergency as well as techniques to search for radioactive substances and to arrange the internal and

external protective zones.

Another important theme to learn is radiation health effects. In the course, the participants were provided with knowledge on how to calculate the internal and external dose in human body at the emergency and how to assess the dose from readings of radiation survey meters. In addition, calculation techniques of radioactivity in a human body were also introduced.

Furthermore, as part of the course, participants learned the topic on monitoring environmental radioactivity around the accident site at Fukushima Daiichi NPS as well as radiation hazardous objects in Kazakhstan, which may cause nuclear or radiological emergencies. The knowledge shared in this course will undoubtedly be helpful to specialists in case a nuclear accident or a radiological emergency arises.



Participants of FTC



Environmental Radioactivity Monitoring

Viet Nam Atomic Energy Institute (VINATOM)
Completed ITC 2010 on Environmental Radioactivity Monitoring and the other two courses

Ms. Nguyen Thi Thu Ha



Viet Nam

Hybrid Training Under the Pandemic

The purpose of this course is to provide participants with the most basic and necessary knowledge in both theoretical and practical sides about environmental radioactivity monitoring. VINATOM, in collaboration with JAEA, organized the tenth FTC on environmental radioactivity monitoring from 18 to 22 October 2021 in Hanoi, Viet Nam. FTC is open to applicants who work for environment monitoring related organizations and academic institutions, willing to contribute to human resource development. This course provided participants with an opportunity to acquire the basic knowledge of environmental radiation and radioactivity monitoring. The course also involved a lecture on migration of radionuclides after the Fukushima Daiichi NPS Accident, which was delivered by a Japanese expert. All the

lectures were presented via the internet because of the COVID-19 pandemic, but exercises, such as measurement of gamma-emitting radionuclides in environmental samples, were conducted in person. Since human resource development in this field has been beneficial in our country, we would like to hold the training course every year at Institute for Nuclear Science and Technology, VINATOM.



Guidance of Exercise

Advanced Instructor Training Course (AITC)

TOPICS



Online Lecture Delivery

Advanced Instructor Training Course (AITC) was launched in 2021, aiming at enhancing skills of instructors of FTC. Through AITC, participants are expected to obtain highly advanced knowledge and skills.

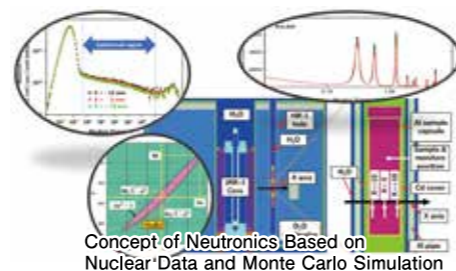
Reactor Engineering

Period: 12 July – 21 July 2021 (1.5 weeks)
Participants: 13

Outline

Participants acquire advanced knowledge and skills on reactor physics and nuclear safety engineering. In JFY 2021, 20 lectures and 2 exercises were conducted via the Internet.

As for reactor physics, we provided the advanced lectures on nuclear data and Monte Carlo simulation methods, in which the participants studied from the history of the development and its role in nuclear engineering to the current hot issues such as "uncertainty". Furthermore, we provided comprehensive lectures on nuclear safety engineering. Especially, on probabilistic risk assessment, the methods of evaluation were provided on influence of a nuclear accident. As for the exercise, the participants had discussions about FTC in their countries and how they will use their experience of the AITC to it. Many good examples and ideas were presented during the discussions, and beneficial information exchange took place.



Concept of Neutronics Based on Nuclear Data and Monte Carlo Simulation

Nuclear/Radiological Emergency Preparedness

Period: 26 July – 4 August 2021 (1.5 weeks)
Participants: 13

Outline

Participants acquire highly advanced knowledge and skills on commanding a response to a nuclear emergency. In JFY 2021, 12 lectures and 4 exercises were conducted via the Internet. Some parts of the curriculum were joint classes with AITC on Environmental Radioactivity Monitoring.



3D Visualization Technology of Radiation Distribution

When radioactive materials are released into the atmosphere, although they are not noticeable by human senses, we must detect them, plan an emergency response action, discuss protective measures including evacuation and determine what to do. The lectures were provided on mechanism of atmospheric emission as well as evaluation method on dispersion of radioactive materials in the atmosphere, 3D visualization technology of radiation distribution including drone technology, and environmental radioactivity monitoring technology at emergency such as unmanned aerial vehicle technology. The exercises and group discussions on planning emergency response action were also held. The participants actively asked questions about the principles of 3D visualization of radioactive concentration and how to use the atmospheric dispersion calculation code in each country. Through group discussions, the participants from each country were able to deepen their friendship.

Environmental Radioactivity Monitoring

Period: 26 July – 4 August 2021 (1.5 weeks)
Participants: 10

Outline

Participants acquire highly advanced knowledge and skills on management of environmental radiation monitoring even in a nuclear emergency. In JFY 2021, 10 lectures and 3 exercises were conducted via the Internet. Some parts of the curriculum were joint classes with AITC on Nuclear/Radiological Emergency Preparedness.

Adequate preparedness in the normal operation stage is important to protect residents around nuclear facilities in case of a nuclear accident. Therefore, a concept and method of risk assessment for nuclear facilities, environmental monitoring system and programs for a nuclear accident and monitoring technology were provided through lectures, exercises and discussions. As for an accident with atmospheric dispersion of radioactive materials as well as impact assessment of the surrounding areas, the lecture was delivered using calculation code such as Worldwide version of System for Prediction of Environmental Emergency Dose Information (WSPEEDI). The participants exchanged their ideas about effective ways of environmental radiation monitoring in emergency, and we received many opinions that they would like to work on an exercise using calculation codes by themselves in Japan when the pandemic is over.



Image of WSPEEDI and Environmental Radiation Monitoring Vehicle

Voice from the Past ITC Participants



National Nuclear Energy Agency (BATAN), National Research and Innovation Agency (BRIN)
Completed ITC 2009 on Reactor Engineering III and the other one course

Mr. Fatmuanis Basuki

Indonesia



Benefits of ITC

It was 1997 when I first participated in ITC on Radiation Measurement and Radiation Protection, and after that in 2009, I had the second opportunity to take part in the ITC on Reactor Engineering III. After attending ITC, I continued to work, contributing to the development of human resources as a training committee, trainer, training coordinator and training manager. In 2020, I was promoted to director of the Center of Education and Training Center (CET-BATAN).

The ITC provided not only technical competence in the nuclear field but also soft competencies that greatly influenced the way of thinking, working, and contributing to developing the capability of talented human resources.

Integrated Learning at ITC as Learning Method Model

We adapt the integrated learning carried out at ITC to the CET-BATAN learning method. Current learning method at Corporate University of CET-BATAN is "10:20:70" learning method, which consists of the following components: 10% of

structured learning through lectures and e-learning; 20% of social learning through coaching, mentoring, feedback and community; and 70% of learning based on the experience in the workplace through project assignments, action learning, problem solving and self-directed learning. Integrated learning is expected to accelerate the achievement of excellent and talented human resources at BATAN. We highly appreciate the cooperation and collaboration between CET-BATAN and NuHRDeC, JAEA which has continued for more than 25 years. I really expect our cooperation will continue for our mutual benefit.



Bangladesh Atomic Energy Commission (BAEC)
Completed ITC 2010 on Nuclear/Radiological Emergency Preparedness

Ms. Shampa Paul

Bangladesh



Role as the First ITC Participant from Bangladesh

I was the first participant from Bangladesh for ITC on Nuclear/Radiological Emergency Preparedness in 2010. Things I learned at ITC were assets for my next journey. Since 2012, the first year of FTC, I have acted as a resource person in almost all the FTCs on NREP. Working on FTC with

diversified people from different fields and organizations as well as JAEA experts, is a great experience. I also have delivered lectures in the in-house training program in my institute. I have had the privilege to be an expert in the training for radiation control officers and Engineering University students.

Experience in FTC, My Plan for Future

I have been engaged in FTC as a course co-coordinator and a lecturer every year. As a lecturer, I try to convey complicated

contents in a more joyful and understandable way. I became a course coordinator in 2019, and was able to introduce the integrated emergency drill for the first time. I have made the table top exercise more interactive. Everybody gave a speech and described their role with enjoyment. With good teamwork of all participants and instructors, we overcame all the difficulties to run a course. When I have the next opportunity, I would like to improve the integrated emergency drill to train more diversified people effectively.



Philippine Nuclear Research Institute (PNRI)
Completed ITC 2011 on Environmental Radioactivity Monitoring

Ms. Rosario R. Encabo

Philippines



Opportunities Brought by ITC

Participating in ITC on Environmental Radioactivity Monitoring is indeed one of the milestones in my career as a research specialist, and I am grateful for that great opportunity. It helped me nurture my knowledge on environmental radiation monitoring and develop my skills as a lecturer and a course coordinator as well. The ITC also helped me boost my confidence and enhance my teaching capability.

I was invited as a guest lecturer of ITC in 2014 and became a lecturer in PNRI Nuclear Training Center for Course on Radioisotopes Technology. In addition, ITC gave me an opportunity to gain new friends especially JAEA experts and staff.

My Experience in FTC as Lecturer

Being an FTC coordinator and a lecturer gave me a chance to share my knowledge and experiences. Through FTC, I met a lot of people from different fields such as academe, government institutions and private industries, and enough appreciation of the training course was gained from the

participants. As an FTC instructor, I am looking forward to developing my skills more in teaching acquired knowledge. As a course coordinator, I will update the training syllabus to include new interesting topics such as environmental radioactivity monitoring in emergency situations and environmental dose calculations using dispersion simulation models, which I have learned from AITC. We held FTC online last year, but I am also hoping to conduct FTC face to face again to include field exercises and to achieve the objective of the course entirely.

Nuclear Technology Seminar

Basic Radiation Knowledge for School Education

Period: 8 November – 18 November 2021 (2 weeks)
Participants: 19

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 or governmental agencies, persons involved in educational administrations and school teachers. In JFY 2021, the course provided 7 lectures, 4 exercises and 3 facility visits via the Internet about basic knowledge of radiation and nuclear power as well as Japanese radiation education method.



Live Streaming of Exercise

Learn Japanese Radiation Education Method

We invited students from Ibaraki Prefectural Mito Daini Senior High School to experience the radiation measurement exercise designed for high school students so that seminar participants can learn the practical example of an outreach activity via the Internet. In the exercise, measurement of radiation from everyday things and some experiments on gamma ray were live streamed, in which gamma ray attenuation with distance and how to shield it were demonstrated. The students tried quizzes on the result of the experiments, then they confirmed the right answers through observing the measurements demonstrated by the JAEA staff. Later we received some comments from the participants that it was very informative as an example of online exercises. Also, both the participants and Japanese high school students enjoyed international exchange through the participants' presentations on their culture.

Moreover, through introductions of a supplementary material and educational videos in the lectures, participants were able to realize the importance of making learning fun for children. In the future, we hope each participant will implement radiation education in accordance with their country's situation while referencing to Japanese examples.



Radiation Measurement Exercise

Comments from High School Students

We only had a vague knowledge of radiation before, but we were able to know many properties of radiations through the exercise. We used to think radiation was dangerous, but we were surprised to know the things around us contain radioactive materials and we are exposed to radiation even in our everyday lives. Also, we learned how to protect ourselves from radiation. In the cultural introduction section from Asian participants, it was very interesting to listen to the presentations on culture of Kazakhstan and Philippines.



Participation in Exercise from High School

Nuclear Plant Safety

Period: 25 October – 25 November 2021 (5 weeks)
Participants: 8

Outline The course is open to researchers and engineers engaged in the field of radiation application, fundamental nuclear technology and operation of commercial or research reactors in Asian countries. The course provides participants with lectures on safety measures and risk assessment for nuclear facilities, operation and maintenance of nuclear reactors, prevention of nuclear disaster and management of radioactive wastes. Moreover, it provides exercises and nuclear related-facility visits as well as information exchange and discussion on each country's nuclear power generation plan. In JFY 2021, the course provided 19 lectures, 1 exercise, 10 facility visits and 3 discussions via the Internet.

Implement Virtual Facility Visits

The reactor operation exercise at Atomic Energy Research Institute of Kindai University was live streamed with multiple cameras, and the participants were able to acquire the knowledge on a reactor core of a nuclear power plant system by observing the starting up the research reactor and confirming the process from power ascension to criticality. As for the facility visits, the participants observed nuclear power plants and manufactures, and had active question and answer sessions with the staff there.



Reactor Operation Exercise

Site Preparation and Public Relations

Period: 17 January – 27 January 2022 (2 weeks)
Participants: 10

Outline The course is open to governmental officials in nuclear regulation and public relations. The course provides participants with lectures on laws and assessment regarding site preparation of nuclear facilities, public relations activities, and risk communication as well as a visit to a planned construction site of nuclear power plants. Furthermore, participants exchange information and have discussions on each country's nuclear power generation plan. In JFY 2021, the course provided 9 lectures, 5 facility visits and 2 discussions via the Internet.

Learn How to Choose Site

The pictures of the construction sites of Tsuruga Power Station Units 3 and 4, which will be the first advanced pressurized water reactors (APWR) in Japan, were presented to learn the current situation of the sites. From this year, we have provided the lectures on seismic-resistant design for nuclear power plants. Also, the lecture on external event assessment has been added to the course because the topic has become more important after Fukushima Daiichi NPS Accident. The participants acquired the necessary knowledge to choose a site for a nuclear power plant through the lectures.

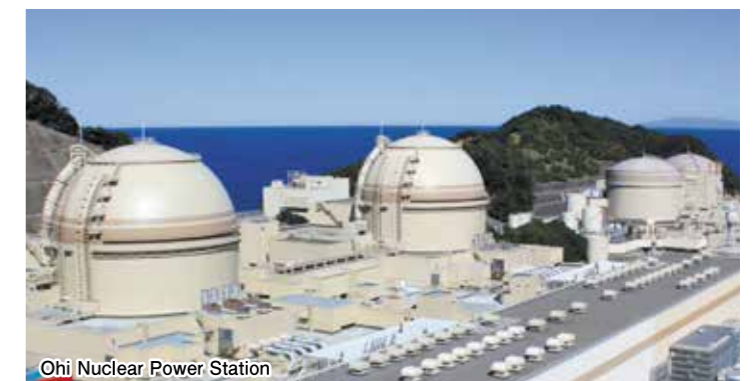


Construction Sites of Tsuruga Power Station Units 3 and 4

Nuclear Energy Officials

Period: 29 November – 23 December 2021 (4 weeks)
Participants: 11

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. In JFY 2021, the course provided 18 lectures, 7 facility visits and 3 discussions via the Internet.



Ohi Nuclear Power Station

Discuss the Leadership

In the virtual facility visit of Ohi Nuclear Power Station, Kansai Electric Power Company, Incorporated., the facilities inside the power plant were introduced with a 360-degree view so that the participants could have a realistic experience as if they were there. Furthermore, the participants from seven countries discussed the leadership of each country.



The Great East Japan Earthquake and Nuclear Disaster Memorial Museum

39 Takada, Nakano, Futaba machi, Futaba-gun, Fukushima Prefecture 979-1401
Tel:+81 (0)240-23-4402 / Fax:+81 (0)240-23-4403



Nuclear Disaster Evacuation Drill in Terunuma Elementary School

Fukushima Prefecture

Disseminate Experience and Learning from the Disaster

The Great East Japan Earthquake and Nuclear Disaster Memorial Museum (Memorial Museum) was opened in Futaba machi, Futaba-gun, Fukushima in September 2020. We interviewed Mr. Takashi Kitsunai, a director of Planning Department, who has been organized Memorial Museum to disseminate experiences of people in Fukushima so that we can learn from them. The museum is also expected to become one of the hubs for revitalization.



Mr. KITSUNAI Takashi
Director of Planning Department
at Memorial Museum

JAEA What was the background for the establishment of Memorial Museum?

Mr. Kitsunai Fukushima experienced unprecedented and complex disaster from the earthquake and the subsequent nuclear power station accident. A concept to establish Memorial Museum was born out of a wish to record and preserve accurately what people in Fukushima experienced before their memories fade away.

JAEA How do you design the exhibitions on the complex disaster?

Mr. Kitsunai Nuclear disaster is not visible unlike the physical impact by tsunami. It is difficult to preserve the situation of the damage and restoration of areas as exhibition materials. Therefore, we would like visitors not just to look at things but to listen to the *Kataribe* or storytellers, who have experienced the disaster, to feel "the abandoned daily lives".

JAEA There must be so many things that people can recognize only through realistic experiences. Could

you tell us more about what you would like to convey to people in Japan and abroad through the exhibitions and activities?

Mr. Kitsunai We want to make this place where people can seriously think about the things such as "We must let Fukushima be the last one to have experienced a nuclear disaster" or "What can we do to prevent such disasters?" and so on. Most importantly, we would like everyone to recognize that anyone can encounter a disaster because various disasters have frequently occurred lately, and what people in Fukushima experienced can happen to you, too. If you visit this place, you will understand the disaster better than just hearing from someone. We hope a lot of people will visit here.

JAEA Thank you very much. We also hope more and more people will visit Memorial Museum and have realistic experiences.



Ms. ENDO Miku
Staff of Public Relations
at Memorial Museum

JAEA Ms. Miku Endo, who tells her experience of the disaster to visitors as a *kataribe*, is staff of Public Relations Department of Memorial Museum and shared her thoughts.

When I was a student of Futaba Future High School, I joined the activity known as "future creativity quest" to solve local problems for the future. After the earthquake, we made an opportunity to learn cooking from aged people, hoping to "encourage them even just a little". Through the activity, I was able to recognize the aged people were gaining energy gradually, and I came to think strongly that I want to contribute to the revitalization of Fukushima. This is how I began to work at this Memorial Museum. I hope younger generation to think of a disaster as something they might experience someday, and I wish such a way of thinking will bring them a lot of good lucks and happiness.

Ibaraki Prefecture

Nuclear Education in Terunuma Elementary School

Terunuma Elementary School is in Tokai-mura, Ibaraki Prefecture, where many nuclear facilities are located. It holds activities on nuclear education and an evacuation drill every year for children. We interviewed Mr. Kikuchi, a principal of Terunuma Elementary School, about the contents of nuclear education and what he wants to convey to children.



Mr. KIKUCHI Yoshimitsu
Principal of Tokai Village
Terunuma Elementary School

JAEA Could you tell us the background of nuclear education at your school?

Mr. Kikuchi There are many nuclear facilities in Tokai-mura. If by any chance an accident occurs in those facilities, children must protect themselves. Therefore, we provide nuclear education and an evacuation drill as part of health safety education every year.

JAEA We understand you have been working on very important initiatives. What are the contents in the nuclear education?

Mr. Kikuchi We teach "how to evacuate" to the first and second graders and "how much radiation there is around us, and what level of radiation is harmful to human body" to the third and fourth. The fifth and sixth graders learn "Why Fukushima Daiichi NPS Accident occurred, and what the effects of the accident were". There is a limitation of what the teachers can do to disseminate knowledge correctly, so we ask specialists to help us with classes and exercises.

JAEA How are the children's reactions?

Mr. Kikuchi One student commented that, through exercises, it was amazing to realize that there is radiation around us and we can shield it with paper, iron or lead. Another student had opinion commented that we must think thoroughly so that a nuclear accident will never occur again in the future.

JAEA Surely, learning from experience is the best way to understand. Could you tell us about an evacuation drill you hold every year, too?

Mr. Kikuchi We normally keep gloves, masks, disaster prevention hoods and gym clothes in the classroom to be prepared for a nuclear disaster. During an evacuation drill, students practice a series of actions such as evacuating to the classrooms, changing into gym clothes, putting on gloves and hoods and finally getting prepared to get on the bus.

JAEA Although prevention of an accident is the most important issue, it is true that training for emergencies is also necessary. Lastly, could you tell us what you would like to convey to children through nuclear education and an evacuation drill?

Mr. Kikuchi We would like our students to think what they can do to protect people's lives as well as themselves based on the correct knowledge on nuclear power and radiation. Moreover, we would like them to be able to think what they should do to better society in terms of social issues, such as the energy problem, by learning the facts of the nuclear disaster.

JAEA Thank you very much. It was very impressive that your school provides nuclear education in which children also learn to be able to think by themselves based on the correct knowledge. We hope the educational activities at your school will be maintained and become more effective ones to create a better society.



Kazakhstan

Interview

Director General

Prof. Erlan Batyrbekov

National Nuclear Center of the Republic of Kazakhstan (NNC RK)

Professional Background

Prof. Batyrbekov graduated from Moscow Engineering Physics Institute. He started to work at the Institute of Nuclear Physics, where he was promoted from an engineer to a leading researcher. From 1992 to 1994, he continued his research in Nuclear Engineering Department of the University of Illinois, USA. He had been a head of Laboratory for Physics of Nuclear Power Facilities in the Institute of Atomic Energy, NNC RK, since 1994. He was appointed to the First Deputy Director General of NNC RK in May 2009 and he has been Director General since 2013.

Prof. Batyrbekov is an expert in conversion of Semipalatinsk nuclear test site for peaceful use. He is also a coordinator of Forum for Nuclear Cooperation in Asia for the Republic of Kazakhstan.

Question

What Are Human Resource Development (HRD) Policies in Nuclear Field in Kazakhstan?

Answer

The support and development of human resources is important for any organization, especially in nuclear industry. Kazakhstan pays special attention to the training of personnel for research organizations engaged in the field of nuclear science and technology. The activity of NNC RK covers the implementation of research in nuclear power, radioecology, geophysics, nuclear safety and nonproliferation. It determines the high demand in human resource development as one of the enterprise strategic directions.

NNC RK together with higher education institutions and foreign partners, carry out annual work in this area that includes development of educational programs, practical training, traineeship program and training courses. The contribution of Japanese government in supporting the sustainable development of Kazakhstan's human resources has been highly beneficial. This is evidenced by the long-standing and positively developing cooperation between Kazakhstani and Japanese organizations in area of education and science.

Question

How Do You Evaluate ITP, and How Did You Conduct HRD Under Pandemic?

Answer

Kazakhstan has been participating in ITP since 2010. The main result of participation in the program is continuation of FTC based at the national research institutes. Holding FTC ensured sustainable training work in the field of nuclear industry and radioecology and contributes to the development of the national system for training specialized personnel. Past ITC participants have successfully trained NNC RK specialists and university instructors in the FTC since 2012.

The global spread of coronavirus since 2020 has forced major changes in all aspects of human life. However, JAEA and NNC RK have continued holding training courses by using online communication technologies. It should be noted that sharing and learning of new knowledge is an important part of personnel training and nuclear industry development, and it always needs a great deal of responsibility. Cooperation between Kazakhstan and Japan demonstrates a successful example for specialists training under the pandemic.

Education on Basics of Radiation in Asian Countries



Malaysia

Ms. Norfadhilah Binti YUSOFF

Ministry of Education, Malaysia

Completed Seminar 2017 on Basic Radiation Knowledge for School Education

Efforts to Provide Interesting Activities on Radiation for Children

Nuclear science is one of the fields in science subjects for lower secondary students and in physics subjects for upper secondary students. To enhance teachers' ability to give interesting lessons on radiation, hands-on activities were introduced by the teachers who had participated in Seminar on Basic Radiation Knowledge for School Education (BRSE) organized by JAEA and RAS0079 courses by IAEA. Malaysian teachers participated in Seminar for the first time in 2013, and they had an opportunity to understand and deepen the knowledge of radiation and nuclear education, especially in planning interesting teaching contents and hands-on activities. Science teachers who have participated in Seminar appreciate the support and contribution by the organizers and trainers as they have provided useful knowledge and exciting activities.



Radiation Education Activity in Malaysia

Fruitful Experience in Seminar

I participated in Seminar on BRSE in 2017. One of the most important activities I experienced was a visit to the museum, where there was a simulation of the Fukushima Daiichi NPS Accident. The facility provided lessons to be shared with the Malaysian people because there are no NPP in our country. The seminar was accompanied by exciting presentation and hands-on activities. The experience of participating in Seminar gave me an opportunity to be a facilitator to disseminate the contents needed in Malaysia. I hope the support of JAEA will continue and more Malaysian teachers will have the opportunity to participate in this course to gain experience in Japan. I would appreciate it if JAEA could provide a virtual tour of JAEA, Tokai-mura, Ibaraki Prefecture, in which many teachers can join.



Thailand

Mr. Raksapol Thananuwong

The Institute for the Promotion of Teaching Science and Technology

Completed Seminar 2017 on Basic Radiation Knowledge for School Education



Basic Radiation Education in Thailand

According to the current learning indicators and learning standards of Thailand's Basic Education Core Curriculum, Thai students start learning about radiation in middle school. They first learn that there are radioactive elements which spontaneously emit radiation that could be useful or harmful. They learn to analyze information about the levels of radiation in different locations and conclude that harmless amounts of radioactive materials are always present in their environment. Then, in high school, they learn about the three main types of radiations. They also learn about the benefits and risks of each type of radiations and how to protect themselves from the harmful effects of radiations.

Development of Teaching Materials for Now and Future

After my training in the Seminar, I have used my experience to develop some contents about radiation in high school physics textbooks and teacher guides. The books are used as the main teaching and learning resources in most

Thai public schools. I have also conducted teacher professional development on how to teach about radiation effectively.

I have adopted some approaches similar to the one in *Supplementary Material on Radiation for Secondary School Students* published by JAEA, to teach Thai high school students about radiations. For example, to clarify the concept of radiation, a comparison between light emitted from a light bulb and radiations emitted from radioactive material are illustrated in the textbook. Another example is the use of cloud chamber activity to engage and teach students about properties of radiations.

In the future, I have a plan to expand the teacher professional development program and analyze data of students' scores in national examinations to evaluate students' understanding on radiations. I would like to make some modifications on our textbooks and teacher guides based on the analysis results. Moreover, I will create supplementary digital learning materials that can enhance students' understanding on radiation.



Radiation Education Activity in Thailand

ITP Schedule in JFY 2022

Course		Course Period	Announcement	Deadline	Selection Result	Place	Participant
ITC	Reactor Engineering	14 Nov - 16 Dec 2022	July, 2022	August, 2022	September, 2022	Tokai, JAPAN	8
	Nuclear/Radiological Emergency Preparedness	14 Nov - 2 Dec 2022					5
	Environmental Radioactivity Monitoring	14 Nov - 2 Dec 2022					4
AITC	Reactor Engineering	20 Sep - 30 Sep 2022	May, 2022	June, 2022	July, 2022	Tokai, JAPAN	8
	Nuclear/Radiological Emergency Preparedness	20 Sep - 30 Sep 2022					4
	Environmental Radioactivity Monitoring	20 Sep - 30 Sep 2022					5
Seminar	Nuclear Plant Safety	24 Oct - 18 Nov 2022	May, 2022	June, 2022	July, 2022	Tsuruga, JAPAN	10
	Nuclear Energy Officials	28 Nov - 16 Dec 2022	May, 2022	June, 2022	July, 2022	Tsuruga, JAPAN	10
	Basic Radiation Knowledge for School Education	17 Oct - 28 Oct 2022	May, 2022	June, 2022	July, 2022	Tokai, JAPAN	14
	Site Preparation and Public Relations	19 Sep - 28 Sep 2022	May, 2022	June, 2022	July, 2022	Tsuruga, JAPAN	10

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

Message from Director of NuHRDeC



Director
Mr.KATO Hiroshi Nuclear Human Resource Development Center
 Japan Atomic Energy Agency

The spread of COVID-19 has continued to rise in the world including Asian countries in this year. I understand that the current status is still severe while repeating a cycle of getting better and worse, and has not return to the state before the pandemic although each country has implemented counter measures against the infection. ITP also continues to face restrictions in conducting in-person training. On the other hand, it is safe to say that there were some positive results of this year such as the increase of the number of participants in the training courses via the Internet compared to the usual face-to-face training courses and having launched AITC successfully.

I believe we can contribute to the promotion of nuclear technology or radiation application in Asian countries by continuing ITP in a way even more effective, which will also bring about development in those countries. I also think it is our honor to do so. I hope we will overcome this difficult situation and open a new phase.

ITP Counterparts in JFY 2021

Country	Organization	Abbreviation
Bangladesh	Bangladesh Atomic Energy Commission	(BAEC)
Indonesia	Indonesia National Research and Innovation Agency	(BRIN)
Kazakhstan	National Nuclear Centre 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 are truly grateful to be able to issue this Newsletter vol.8 with cooperation of everyone from many fields. As for this fiscal year, all the courses were delivered via the Internet as in the previous year. We improved the training courses to make them more effective by learning from the experience of the last year. Exercises, facility visits and discussions were incorporated to each course. We are glad that many of the participants communicated each other through these opportunities, and so did the participants and the Japanese lecturers. We also have launched AITC, in



which the highly advanced contents were provided for the FTC lecturers in Asian countries. We hope we will be able to publish articles and photos of participants' enthusiastic activities on Newsletter vol.9 as well.



Japan Atomic Energy Agency (JAEA)

International Nuclear Human Resource Development Section
 Nuclear Human Resource Development Center (NuHRDeC)
 2-4 Shirakata, Tokai-mura, Naka-gun, Ibaraki, 319-1195 Japan
 Tel +81-29-282-6748 Fax +81-29-282-6543
 Our website https://nutec.jaea.go.jp/english/training_course.html

Our Website



This newsletter is edited and published by NuHRDeC, JAEA under the contract with the Ministry of Education, Culture, Sports, Science and Technology (MEXT).