ANNEX: Country Reports 2016 FNCA HRD WS

Australia

Since the 2015 FNCA Workshop on HRD, there have been significant developments in Australia's education programs including:

- Tours: 15,000 visitors once again participated in tours of the Lucas Heights facilities
- Workshops: Made a $5,000 profit in a two week (July) school holiday period and now exploring an incursion model (i.e. conducting workshops in schools) with estimated profits of $80 – 100,000 per year.
- Video Conferencing: 18 special events to 1,200 students and 6-8 international conferences
- Teacher Events: teacher professional development days to over 300 teachers. These one day development programs are effective at making teachers more engaged in nuclear science and the programs are now reputable and easy to fill.
- Student Events: Trialed a two day "girls only" experience. Very high percentage of girls have changed their perception of nuclear science and will now study physics/chemistry at higher education levels. Planning a national week long experience in November 2016
- Resources: Launched a new Atom Builder game and in the final stages of launching a radiation infographic tool
- Outreach: Expansion of key outreach show, Fact or Fiction, with inclusion into the 2017 World Science Fair in Brisbane. Launched a new Citizen Science program called Feather Map. Citizens send in collected bird feathers and ANSTO used nuclear techniques to determine the health of the bird and the wetland that it inhabits.

Bangladesh

Bangladesh Atomic Energy Commission (BAEC) has the ultimate mandate and honor to carry out research and development activities for the development, use and expansion of atomic energy for the welfare of the people of Bangladesh. The BAEC, through its research and development (R&D) activities, contributes to a wide range of sectors of national economy like energy, human health, food, agriculture, industry, environment, water and mineral resources, information technology, infrastructure, education etc. The Government has taken initiatives to strengthen infrastructure for education and research in nuclear science and technology and enrichment of nuclear education from secondary school level to

the university level. A couple of universities in the country have been taken initiatives to open nuclear engineering courses, mostly in the post-graduate level. As a part of the strategy to develop nuclear oriented generations in the country, Nuclear Energy topics has been introduced in the curriculum of Secondary and Higher Secondary education system. Establishment of coordination and cooperation of government, education sector and BAEC are essential for developing sustainable nuclear education programme of my country.

China

In China, Ministry of Education has not set up uniformly the course of nuclear science in primary, elementary or high schools.

Up to now, Nine Nuclear Power stations of CGN in China have launched a program named “Popular Nuclear Science into Schools: A Child Impact A Family” which offered the course of nuclear science to more than 15,000 students of 70 schools.

The teaching methods of this course from these 70 schools are almost identical.

- The course is one class hour per week or month.
- Most of the textbooks have about 40 pages.
- The course carries one credit in some schools, but it has no credit in other schools.
- The course is suitable for the junior one and two students.
- At the end of this course, schools will arrange for students to visit some NPPs and take final exams of this course.
- The content of these textbooks is basically the same. The presentation will take Dayabay’s textbook and Cangnan’s textbook as examples.

The program is a good beginning for now, but we will make greater efforts to make it best.

Indonesia

Indonesia has already introduced nuclear science through national educational curriculum for high school level since 2003, and starting from 2009 BATAN conducted cooperation with Ministry of Education and Cultural Affairs in supporting the education community in implementing the nuclear science lessons. BATAN and MoEC established Nuclear Smartbook and digital lessons CD since 2010 to support the teachers in preparing teaching materials. The materials are being introduced to schools through monthly education activities (Nuclear Goes

to School and Facility Visit). Since 2015 the materials were being enriched in line with the implementation IAEA Technical Cooperation Program in Compendium of NST for Secondary Schools Pilot Program, and also being integrated with FNCA HRD Program since 2016. During the program implementation in new schools at Jakarta region in 2016, based on qualitative measures, the program is proven to be effective in giving positive influence to the students in learning nuclear science and technology and also increasing their interest in joining nuclear science related majors in higher education level. This shows the program is very essential to become part of HRD program, as it may increase the number of potential future nuclear industry workforce. However, further quantitative evaluation and continuous program implementation is essential to ensure sustainable program in the future.

Japan

In Japan, the school students and teachers were invited in the “Basic Radiation Knowledge for School Education Course (a seminar in ITC program) of JAEA where teachers, education officers, public relation specialists, radiation scientists from foreign countries participated as trainees. The school students evaluated as follows: 1. They get great interest in radiation for that they had bad impression before. 2. Natural radiation has no influence for body.

Ministry of education and science (MEXT), Ministry of economy, trade and industry (METI), Prefectural Governments, and Non-governmental organization for the radiation science also conducts the activities to promote education on radiation and nuclear science.

It is important and necessary to include contents of radiation science in school curriculum for dissemination of the proper understanding of radiation and nuclear energy.

Kazakhstan

There are four main parties are identified in the educational process in the area of radiation in Kazakhstan: 1) school teachers which lead standard course of physics at schools and optional classes; 2) Nuclear Energy Industry Informational Center (NEIIC) which involves the students in education process by means of lectures, media, cinema, board games etc.; 3) Nuclear Society which develops the educational programs and publishes the supporting materials; and 4) Nuclear enterprises which organize workshop, lectures, study tours and excursions for the students.

The lecture materials on radiation which used in educational process are being prepared by parties, as rule, excluding standard school physics program which includes the appropriate unit. Last examples of lecture materials are “Radiation among us” of Nuclear Society and “Atom prospectus” of NEIIC. Nuclear enterprises such as National Nuclear Center for example prepare the materials on the base of its own vision for the each specific case. The materials which are provided by JAEA in frame specialized training courses and workshops are often used as the base for such materials. Former participants of such courses and workshops prepare the material and play role of teachers after their return to the Kazakhstan.

Korea

Nuclear industry contributed a lot to the growth of Korean economy. An key factor for Korean economic development is HRD on nuclear energy. Nuclear Training Center of KAERI has education and training programs for industry personnel, for students and teachers, for KAERI staff members and for foreign personnel with education and training facilities. KAERI is trying to supply proper and unbiased nuclear education programs for each target audience. Students have shown their interests in experiencing nuclear activities, and especially high school students acquired useful information for their career development. More attention is being given to nuclear outreach especially to future generations. Education based outreach is an area of importance, which is being promoted at governmental level and international level. Reference programs based on outreach model for NTC/KAERI is developed to support KAERI activities, to contribute to the national nuclear outreach efforts, and to promote international E&T on nuclear outreach.

Malaysia

Since 1980s, nuclear education outreach for secondary schools was successfully implemented in Malaysia. The programme is well collaborated between Malaysian Nuclear Agency (Nuclear Malaysia), Ministry of Education (MOE) and Ministry of Science, Technology and Innovation (MOSTI).

The nuclear education outreach are varies and can be divided into three phases. The first phase was started in 1980s till 1990s, and the programme is known as Nuclear Science and Technology (NST) Talk and Exhibition for Secondary Schools. The second phase started in 2013, where Nuclear Malaysia has introduced new outreach programmes called Nuclear Camp Veni Vidi Vici and Scientist Icon Roadshow. Both programmes are still running till 2016.

The third phase started in 2015, when Malaysia was invited to be pilot countries for IAEA Technical Cooperation Program in Compendium of NST for Secondary Schools Pilot Programme. By participating in this programme, Malaysia has enriched the new method in outreach activities so that the students become more engaging with science. Besides all the programmes mentioned, Nuclear Malaysia has also organised few programmes which indirectly promoting NST to students; nuclear facilities visit, public exhibitions and nuclear talk.

Mongolia

1. The first delivery of information about radiation of nuclear energy is going to be developed to the program of Secondary school also included radiation influence program for children's mental issues and specific radiation program for public institutions.
2. The support of the Ministry of Education and Science is necessary on the issue of inclusion of nuclear technology and science information and implementation of programs into the Secondary school teaching materials.
3. For the adoption of long-term programs and funding for training human resources, the nuclear industry has to focus on receiving support from the Government and International cooperation.
4. We are looking for further explore and implementation of e-learning materials under the project.

The Philippines

The PNRI thru the Nuclear Regulatory Division (NRD) Training Needs Assessment Committee developed the “Human Resources Development Plan and Training Programme (HRDTP) for the Staff of NRD within PNRI” in preparation for the NPP for 2017-2021.

PNRI staff and other personnel participate in foreign trainings offered by IAEA, EU, ANSN, JAEA, KINS. Local training courses are conducted by the Nuclear Training Center (NTC) of PNRI for radioactive material licensees, teachers, doctors, engineers and other professionals. PNRI also offers On-the-Job Training Program for Undergraduates and Thesis/Research Advisorship Program.

Enhancement of the existing PNRI Outreach Programme aims to promote nuclear science education in the country. These activities include: Public information activities, nuclear and radiation facility visits, development of information materials, conduct of public awareness seminars in the regions, Atomic Energy Week celebration, Philippine Nuclear Congress, Philippine

Nuclear Youth Summit, Philippine Nuclear Science Quiz, On-the-Spot Poster Making Contest, Essay Writing Contests, and other friendly competitions that would promote nuclear science and technology.

The Philippines spearheaded by the Philippine Nuclear Research Institute (PNRI) and the Department of Education participated in the pilot launching of the IAEA Outreach Programme using the Compendium on Nuclear Science and Technology for Secondary Schools on 21-14 January 2015. The pilot schools, namely: San Francisco High School and Quezon City Science High School participated in 3 activities organization of the POWERSET; (2) Seminar/Workshop for teachers & Students in Secondary Schools (SWTSSS); and (3) Science on Saturday (S.O.S.).

Thailand

The nuclear power project in Thailand was first introduced in 1978, second in 1992 and the third in 2007. The plans were postponed because of economic crisis and public understanding issues. The current Power Development Plan or PDP is PDP2015 which the NPP are planning to be operated in 2029. In Thailand, nuclear knowledge, training, education, and outreach activity have been taken up in many sectors including academia and non-academia institutions. The developing/conducting nuclear education material for high school students by Chulalongkorn University was conducted during the second attempted NPP plan. Currently, the work on ongoing of IAEA TC Project RAS/0/075 “Networking for nuclear education, training and outreach programme in nuclear science and technology in the framework of ANENT” and Coordinated Research Project (CRP) on “sustainable education in nuclear science and technology (L53003) and some activities support RAS 0065 project have been initiated at Chuylalongkorn University. The RAS 0075 activity aims to help the secondary and high school teachers to teach students nuclear science and technology by providing e-learning materials. While the CRP activity aims to develop the learning and teaching assistance tool in various forms for secondary school teachers. The RAS 0065 activity aims to train the secondary and high school teachers in nuclear science and technology.

Vietnam

Domestic E&T has been established to train the student from bachelor to PhD degree but it is not sufficent for HRD of NPP needs. The cooperation between dometic organizations and international organizations in HRD is very important

to train the students, sharing informations and infastructures. The local organizations in Vietnam are more “independent” in term of financial issuses because of the recent structure and funding systems of Vietnam. With the help of IAEA, JAEA and other organizations/countries showing big efforts and strong commitment to promote HRD for NPP in VN more effectively and moving forward.