REPORT FROM MALAYSIA FOR THE 5TH FNCA WORKSHOP OF THE HUMAN RESOURCE DEVELOPMENT PROJECT

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1. INTRODUCTION

1.1. Human resource development (HRD) activities continues to be an important agenda in this region and throughout the world for the attainment of the goals of sustainable development, preservation of nuclear knowledge and ensuring nuclear and radiation safety. Regional cooperation such as the HRD project sponsored by the FNCA will certainly help in forging synergy between neighboring nations in achieving these goals. It has to a large extent increased safety awareness and safety standards among the public and the nuclear and radiation personnel. This is evident when Ms. Junko Matsubara, Vice Chairman of Japan Nuclear safety Commission was invited to present a keynote address at the recent 6th Annual Radiation Protection Officers Conference at Kota Kinabalu and she commented, "…… I am deeply impressed by people's (Experts and Officers) big concern on radiation protection."

2. RECENT TOPICS IN THE NUCLEAR FIELD AND RELATED HUMAN RESOURCES DEVELOPMENT (HRD) IN MALAYSIA

2.1. The Malaysian government places high priority for HRD in the national development plan and in international cooperation. The most recent development in the local HRD agenda is the introduction of the new remuneration scheme. This new scheme revolutionized the philosophy of human resource management to one which is based on the principles of competency. The most prominent feature of this new scheme is the introduction of assessment of competency level as the basis for salary increase and promotion.

2.2. Although this new scheme puts a heavy load on the HRD Division, it provides a golden opportunity for enhancing competency in radiation safety. This topic has been included in all syllabus and curriculum of every position and grade. By doing this the staff competency in radiation will be assessed through examinations and upgraded through courses. The passing

mark for this examination is 80%. The high standard should ensure that staff are well versed with safety procedures and have an up-to-date knowledge in radiation safety

2.3. Promotion, education and public acceptance of nuclear science and technology are on-going activities. 4 important activities deserves to be elaborated here - Innovation Day, Flora day, S&T Expo, and Nuclear Science and Technology Promotion to Schools.

2.3.1. Innovation Day – This is an annual event at MINT and its objective is to promote innovation among its staff. Staff display their innovation and compete for gold, silver and bronze medals. This competition is definitely gaining popularity among the researchers and technical support staff as can be seen from the jump in the number of entries every year. While this event has increased innovation in MINT, it has also attracted the interests of school children. MINT invites schools to visit this innovation day and organizes special programme for the students. The response from schools is overwhelming and it manages to attract about 3,000 children every year. Many students impressed with the applications of nuclear S&T in the innovations. Feedbacks from parents and teachers shows that quite a number of these children have intentions of pursuing their studies in the nuclear field in the future.

2.3.2. Flora day – This is also an annual event that showcases new cultivars produced through R&D in mutation breeding of ornamental plants, fruit trees and recently grass for grazing of animal livestock. This has become an event that nursery operators, plant breeders and landscape architects look forward to every year. This event has created awareness among them that nuclear S&T is relevant in their area of work and can play a big role to play in beautifying the environment and changing the look of landscapes in the future. As a spin-of this event, a Flora Interest Group has been formed and activities are organized for the members in conjunction with Flora day. This group has potential of becoming a society in the future

2.3.3. S&T Expo – This is a national event that is supported by the Ministry of Science, Technology and the Environment (MOSTE) and MINT plays the leading role in the organization of this event. It gets the cooperation of all universities and research institutes. This event is something like the innovation day but on a much grander scale as it is a national event. Competition is more intense and not just among innovators but

also among institution who compete for the most number of awards. Expositions and competitions such as this nurtures the R&D culture and increases the innovativeness of the Malaysian public. The winners of this expo get to compete at international exhibitions such as that held annually in Geneva and other countries. Being a big event that is known among the scientific community in the country, MINT being the chief organizer is brought into the lime light and and gains rapport and support of the scientific community while at the same time nuclear S&T becomes more prominent.

2.3.4. Nuclear Science and Technology Promotion to Schools – This programme gets a budget of RM 1 million under the 8th Malaysian development plan. The target of this programme is to reach to all schools in all districts in all the states and all teachers training colleges in Malaysia. Its objective is to educate them on the application of nuclear technology and radiation safety. About 20 personnel are involved on a part-time basis while carrying out their normal duties and responsibilities. They would leave office for a week at a time to visit a few schools within a district. They would set up an exhibition, deliver talks and carry out surveys. This programme has proven to be very successful and receives positive feedbacks from both teachers and students. As a result of this promotion, there has been an increase in the demand for MINT to participate in exhibitions and other science events and for MINT researchers to deliver talks. MINT now has close rapport with state education departments the the education ministry, forging the way for new collaborations and new programmes in the future.

3. SUPPORT ON THE DEVELOPMENT OF NUCLEAR TRAINING TECHNOLOGY

3.1. Request and/or proposal for mutual support on the development of training technology and its needs on materials and curriculum – Training technology is available in every country. What is needed is content development. At the same time learners needs to be encouraged to learn through e-learning. Presently, learners still prefer classroom type learning sessions as this is the learning method they are accustomed to and classroom type or instructor-led training offers the personal relationship and other social activities and interactions. Neither instructor-led learning nor e-learning can stand on its own. A blend of both would be a preferable mode where e-learning serves as a complement or supplement to the traditional learning methods. Malaysia would like to suggest that countries go ahead in producing e-learning materials and keep other countries informed what they have available so that we can all share whatever contents that have been developed.

3.2. For the time being MINT has not produced any e-learning materials but is seriously planning to develop an e-learning system. Basically our plan is as follows:-

3.2.1. Set up e-learning management system

3.2.2. Set up a recording system for life lectures and these recorded lectures will be converted into e-learning materials.

3.2.3. Administer e-learning using self-developed materials as well as courseware available in the market and through regional and international cooperation

3.2.4. Integrate e-learning with Competency Level Assessment System

3.2.5. Set-up e-learning content development system to make content and courseware development more efficient.

4. SUMMARY OF "SURVEY OF THE BASIC DATA ON HUMAN RESOURCES DEVELOPMENT (HRD)"

4.1. Survey of the Academic Association and Society in the Nuclear Field – The results of the survey are shown in table 1. There are 5 major associations or societies in the nuclear field in Malaysia – The Malaysian Nuclear Society (MNS), the Malaysian Society for Non-destructive Testing (MSNT), the Malaysian Radiation Protection Association (MARPA), the Malaysian Nuclear Medicine Society and the Malaysian Medical Physics Society. All these societies or associations are led by researchers from MINT. Societies or associations are effective forum to voice strategic and policy issues to relevant government authorities.

4.1.1. MNS- This society is formed for the purpose of promoting peaceful uses of nuclear techniques. It organizes various activities, the biggest being the International Nuclear Conference which is held every 5 years, the last one was held in 2002. It holds the X-ray Application Conference and XRD-XRF seminar and workshop every year. Since 2001 the Hiroshima and Nagasaki Commemorative day has become an annual event and attracts an audience of around 400. It publishes the Malaysian Nuclear Bulletin and Journal of Nuclear Society twice a year.

4.1.2. MARPA – Although the youngest among all the nuclear societies, it is characterized by being a closely knit circle of radiation protection officers from industries, regulators from the regulatory bodies and radiation safety trainers or experts. They would gather in the Radiation Protection Officers Conference once a year at different resorts. This is a commendable way of recognizing and appreciating the contributions of those responsible for ensuring safety for workers, the public and the environment. Besides the RPO Conference, the association organizes ad hoc or one-off events such as the Ionizing Energy Treatment seminar held recently which attracted about 50 participants. The society has also published a book – Application of Nuclear Technology and newsletters.

4.1.3. MSNT- This is a society that promotes non-destructive testing. It is well established and professional and supports and maintains the NDT Certification Scheme. It organizes seminar/conference once every 2 years and NDT training courses regularly , publishes its own newsletter and conducts dialogs with the regulatory and certification authorities as well as major industries that demand for NDT services.

4.1.4. MEDICAL PHYSICS SOCIETY- This is another young society. Like any other societies, it organizes conference regularly - once every 2 years

4.1.5. NUCLEAR MEDICINE SOCIETY- This is a well established society and has made significant contribution in the area of nuclear medicine. Since its formation nuclear medicine centers have increased from 3 in 1991 to 11 to date. It organizes training for members – Nuclear medicine Physician, technologist, physicists on a regular basis and helps in upgrading the teaching of nuclear medicine practices in universities. Through its efforts nuclear medicine is now department on its own and nuclear medicine physicians are now recognized as specialists.

4.2. Present Status of the survey data (updates of data presented last year)

4.2.1. There are no significant changes in the data collected last year except for the number of new cancer cases which has increased to 40,000. The number of gamma irradiation facilities remain the same but the variety of materials being irradiated has increased.

4.3. Ways of using the survey data

4.3.1. The data provides a profile of nuclear institutes, personnel, education and application. Most of this data does not change rapidly. Data obtained in a particular year may not signal a need for action but a trend in changes will mean a lot more. A country may cope with current position or conditions but may face problems when there is a sudden increase or decrease in supply or demand. Therefore it is important that data is collected continuously.

4.3.2. Increase in the number of cancer cases should alert relevant authorities to provide more resources and funding and improve infrastructure for example:-

4.3.2.1. Produce more trained personnel – nuclear medicine specialists, oncologists, radiotherapist, nuc lear medicine technologists, etc.

4.3.2.2. Set up more centers to treat and diagnose cancer patients

4.3.2.3. Install more diagnostic and therapeutic equipments

4.3.2.4. Increase enrollment in universities and colleges

4.3.3. For the FNCA HRD project it signals that demand for training in nuclear medicine and oncology for Malaysia will be higher.

5. HRD STRATEGY BASED ON THE SURVEY DATA ANALYSIS

5.1. HRD strategy based on the survey data and its analysis

5.1.1. More data is required

5.1.1.1. Current number of type of personnel to be compared with desired number. This should be based on blueprint of programmes activities.

5.1.1.2. What new skill and knowledge required

5.1.1.3. What major problems must be overcome in acquiring and training personnel

5.1.1.4. What can countries cope on its own and what assistance does it require through regional cooperation example cylcotron technology

5.1.1.5. What skills and knowledge does countries require for seminars, training courses, attachments, post-graduate studies and e-learning

5.1.1.6. What HRD activities is not covered by IAEA/RCA and other projects under FNCA but should be included in FNCA HRD project

5.1.1.6.1. Activities in support of nuclear societies

5.1.1.6.2. Activities in support of nuclear science clubs for youth

5.1.1.6.3. Masters and PhD

5.2. Plan for future activities to promote the interest of the young generation in Nuclear Science and Technology

5.2.1. With the current efforts to promote nuclear science and technology to schools nationwide and the encouraging support received from the ministry and state departments of education, Malaysia has a sound foundation to promote the interest of the young generation in nuclear S&T. Among other things that can be done will be establish the nuclear science youth club. This can be done by approaching the existing science club in schools and the provision of adequate funding which maybe requested under the 9th Malaysia Plan.

5.2.2. In the mean time MINT will continue to accept students for industrial training, final year thesis and MSc. / PhD supervision as well as visits from school children.

6. REQUEST AND PROPOSAL ON MEXT SCIENTIST EXCHANGE PROGRAM IN NUCLEAR ENERGY RESEARCH, INTERNATIONAL TRAINING COURSES, AND UNIVERSITY EDUCATION (MASTER'S DEGREE / DOCTOR'S DEGREE)

6.1. MEXT Scientist Exchange Program – Topics of interest are:-

6.1.1. Nuclear Instrumentation for Small Angle Neutron Scattering (SANS) system,

6.1.2. Analysis of Small Angle Neutron Scattering (SANS) data and modeling,

6.1.3. Design of neutron radiography shielding and collimation system using radiation transport code,

6.1.4. Boron Neutron Capture Therapy (BNCT) dose calculation and modeling of brain structures,

6.1.5. Digital signal processing (DSP) for nuclear instrumentations,

6.1.6. Computed neutron tomography design and algorithm,

6.1.7. Imaging system for neutron radiography,

6.1.8. Delayed Neutron Analysis system design and control,

6.1.9. Fast Detection System design for PGNAA (Prompt Gamma Neutron Activation Analysis),

6.1.10. Modeling of Neutron distribution in a reactor core using numerical methods,

6.1.11. Advance nano-structure material studies using Small Angle Neutron Scattering (SANS),

6.1.12. Heat transfer modeling and design for research reactor,

6.1.13. Spent fuel storage and transfer cask modeling and design,

6.1.14. Research reactor instrumentation and control

6.1.15. Nuclear application and Agriculture

6.1.16. Nuclear Application in Medicine

6.1.17. Nuclear Application in Industry

6.1.18. Non destructive testing in concrete

6.2. International Training Courses

6.2.1. Operation and maintenance of nuclear facilities

6.2.2. Safety analysis

6.2.3. Management course

6.2.4. Radiation application

6.2.5. Dissemination of nuclear knowledge

6.3. University Education (master's degree / doctor's degree)

6.3.1. Same topic as in 6.1

7. CONCLUSION

7.1. In conclusion, for the HRD project to make significant impact it needs to identify its own niche. Something that is important and makes a difference to the present situation but that is not covered under other cooperation programme namely IAEA/RCA and other FNCA projects. The following are some suggestions:-

7.1.1. Participation in events organized by national nuclear societies or associations

7.1.2. Contributions in journals and bulletins published by national nuclear societies and associations

7.1.3. Programme for nuclear science youth clubs

7.1.4. Exchange of elearning materials, textbooks and course manuals among member countries.

7.1.5. Post-graduate studies.