

Education and Training in Radiation Protection – Challenges and Way Forward

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1. Introduction

Occupational, public and environmental radiation protection is a major challenge in all applications of ionizing radiation in all medical, research and industrial areas. Over the years, there is a trend of decreasing number of experts worldwide in radiation protection due to various reasons. A sustainable education and training (E&T) infrastructure for radiation protection is an essential component to overcome the decline in expertise and to ensure continued high level of radiation protection competence in the future. Therefore, building and maintaining the competency of radiation workers and professionals has been identified as a key issue for radiation protection and the safety of radiation sources.

Today, many countries are facing problems to meet growing needs in radiation protection related to industrial radiography and the fast development of medical applications and other practices such as introduction or expansion of nuclear power, accident free nuclear program etc. This requires a strategic approach that will cover the national needs, programs to meet the needs, share experiences at regional level and then move on to international level and seek international cooperation where necessary.

This paper discusses the main concern, the challenges in radiation protection training and how to overcome that, given the circumstances that there is a lack of young faculty members to replace ageing and retiring members.

2. Challenges

A robust, efficient, sustainable training program is essential for an accident free nuclear program. In radiation protection, the target group is a diverse spectrum beginning from safety staff, medical professionals, industrial users, university researchers, atomic energy staff, and public at large including patients. The level of training is different for this mixed group. In addition a critical mass of educated and trained people is also required to handle routine and emergency situations. These are the basic training requirements. Further, there is a continuous development taking place in medical practice and in industrial applications in terms of using radiation sources. This entails a continuous review of radiation protection training and its evolution. In such a situation, training of safety staff is a key requirement to ensure

radiological safety. International organizations like United Nations Scientific Committee on Effects of Atomic Radiation (UNSCEAR), International Committee on Radiological Protection (ICRP) and International Atomic Energy Agency (IAEA) are regularly reviewing the effects of ionizing radiation and consequently modifying the radiation protection principles and publishing revised safety standards. These revisions can reach the vast radiation protection community through training events.

3. Way Forward

The possible approaches, based on national, regional and international levels that could be adopted for building competency in radiation protection are relevant to be considered. Each country faces challenge from different dimensions, while some may not have adequate experts to teach, some may not have the infrastructure, another may not have a continued national training need, in some there are universities offering similar courses without the quality control of atomic energy institutes, in some the regulatory body is at an early stage of development.

3.1 Establishment of national strategy

For building national strategy, the first and foremost approach is the systematic estimation of national training needs. This can be achieved through a national survey and by designing an elaborate questionnaire. Analysing the data collected will aid to conclude if there is a constant training need or not and address the staffing issue and realize if it is necessary to seek support from other countries and/or international organizations. An international expert team deputed by IAEA made an elaborate assessment - Education and Training Appraisal (EduTA) in radiation protection at the Nuclear Training & Education Centre in 2011. The assessment covered in detail, the legal framework, national strategy and national infrastructure for E & T. The major observation by the team was that an effective and comprehensive register of sources and practices is in place. This is seen as a valuable tool for the initial evaluation of the training needs in the country. Further, the assessment stated that the institution and authorities are familiar with an approach for human resources based on planning. In this context reference is made to a Korean case study 'Current Status of Education and

Training in Radiation safety in Korea' [1]. This study has analysed clearly all the E&T programs in Korea and states that the training programs are reactive and meet the needs but require to focus on improving practical skills of trainees.

3.2 A Regional approach to Education and Training

Regional network facilitates exchange of information and sharing of experiences. There may be differences in the training requirements, the regulatory framework, academic system, infrastructure and culture between the countries that are to be at first harmonized on a regional basis through networking, to be extended further to international level.

In this context, IAEA has set up ANENT (Asian Network for Education in Nuclear Technology) to promote, manage and preserve nuclear knowledge and to ensure the continued availability of talented and qualified human resources in the nuclear field in the Asian region.

Essential function of the ANENT is to integrate available resources for education and training in synergy with existing IAEA and other mechanism, to create public awareness about the benefits of nuclear technology and its applications, to attract talented youth in view of alternate competing career options, to encourage senior nuclear professionals to share their experience and knowledge with the young generation and to use information technology, in particular web based education and training to maximum possible extent. It is important to note that Korea has contributed significantly to establish ANENT, as well as a lead in the development of the website and cyber learning platform. Korea is an active participant in inthis network and this practice can be extended to radiation protection training.

3.3 Collaboration with International Organizations

IAEA adopts a strategic approach to education and training in radiation protection and is taking various measures in building capability in the Member States through organising regularly postgraduate educational course in radiation protection and safety of radiation sources (PGEC) in six regional training centres and several practice specific training programs. IAEA has also developed standardized training materials which are practice specific and target audience oriented. To expedite the process of capacity building in Member States IAEA organises Train – the- Trainer programs [2]. Working closely with IAEA, assisting to host their training events or by participating in the IAEA training programs will be a constructive action for building competence. The benefits of hosting IAEA training events could be that a) national training needs are met with b) make contributions to IAEA activities as a Member State c) there is an increased number of international lecturers d) the Member State is

acknowledged in the region.

In addition to these training programs, IAEA has published Safety Guide RS-G-1.4 [3]. This Safety Guide provides guidance for the regulatory bodies for the establishment of training and qualification requirements and a strategy for building competence and Safety Report no.20 [4]. This report provides assistance to trainers and training providers on how to set up training courses, distance learning and on the job training as well as to establish training centres. It addresses the development and provision of training in a range of activities involving work with ionizing radiation. The standard syllabus for Postgraduate Educational Course in Radiation Protection and the Safe Use of Radiation Sources TCS-18 is available in Arabic, English, French, Russian and Spanish, this is intended to facilitate the implementation of such courses by universities and training centres [5]. These publications are useful resources.

4. Conclusion

Radiation applications in medical area like cancer treatment or agriculture or industry require a stable or even growing base of nuclear knowledge and trained human resources. The needs include the initial education as well as the practice specific training and the refresher training in radiation, transport and waste safety. The diversity of topics and levels to be covered is wide and the design of training programs at national level must be in accordance with national legal requirements and include the training of safety staff. Every Member State has the opportunity to use as far as needed the support of IAEA organization for relevant E&T materials and benefit from their assistance and experience. Furthermore, effective training program is necessary to attract young generation to select radiation protection as their career.

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