Education and training on radiation protection at national and regional levels in Greece

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Abstract
The Greek Atomic Energy Commission (GAEC) is the regulatory body, responsible for matters related to radiological protection. Among its responsibilities is the provision of education and training on radiation protection to the occupationally exposed radiation workers, covering the medical and industrial sectors, as well as, to the first responders in case of radiological emergency. GAEC is also responsible for certification and recognition of diplomas in the different areas of radiation protection. Within this frame, GAEC also organizes seminars and workshops as well as, post-graduate education and training courses on Radiation Protection, at national and regional levels. The purpose of this paper is first to describe GAEC's educational and training activities in the above fields and in particular, its participation in the Inter-University Post-Graduate Course on Medical Radiation Physics, running under the administration of Athens University in co-operation with other four Greek Universities and the NCSR "Democritos". Second, to describe the Eastern Europe's Regional Post-graduate Educational Course (PGEC) on "Radiation Protection and the Safety of Radiation Sources", hosted in Athens and supported by an IAEA's TC Programme. The PGEC is offered in the English language based on the IAEA's Standard Curriculum for PGECs.

1. Introduction

The Greek Atomic Energy Commission (GAEC) is the regulatory authority, responsible for issues related to nuclear technology and radiological protection from ionizing radiation. Greece has in force a legal framework, compatible with the Basic Safety Standards [1]. Among others this framework determines the GAEC's authority on radiation protection issues and its responsibilities in the provision of education and training in radiation protection to the occupationally exposed radiation workers. Within this frame, GAEC organizes seminars and workshops as well as, post-graduate education and training courses on Radiation Protection, at national and regional levels. GAEC is also responsible for certification and recognition of diplomas as well as, the adequacy of knowledge and training in the different areas of radiation protection such as industry, health, research, education, transportation of radioactive materials, illicit trafficking (customs and airports), emergency preparedness and response.

Historically, GAEC provides education and training in radiation protection since 1960. Since that time GAEC has organized and hosted more than 500 national and international educational events, addressed to the personnel occupied in medical, industrial, research and other applications of ionizing radiation. At Post-Graduate level, GAEC organized the Medical Radiation Physics Course on regular basis, since 1961. In 1993, this course was upgraded to an Inter-University Post-Graduate Course on Medical Radiation Physics (IPCMRP), and is currently running under the administration of Athens' University in co-operation with other four Greek Universities and the Research Center "Democritos", leading to Master's degree. GAEC is a participant and a major contributor to this course. It also contributes to the Post-Graduate Course on Medical Physics of Patras' University on radiation protection issues.
In the context of its related activities and valuable experience acquired during the past years, GAEC is now recognized as the IAEA's Regional Educational Center, hosting, through an IAEA TC Programme, the IAEA's Eastern European Region Post-graduate Educational Course (PGEC) on "Radiation Protection and the Safety of Radiation Sources". This 23th weeks course, in the English language, is based on the IAEA's Standard Curriculum for PGECs [2]. The structure and the goals of the above courses are discussed.
During the preparation and organization of the Olympic Games "Athens 2004", and in the frame of its statutory role, GAEC provided training to thousands of persons working for several organizations involved in the National Emergency Response Plan, concerning preparedness and response to Nuclear and radiological threats. This effort greatly contributed to the success and security of the Olympic Games.

2. Postgraduate Courses on Medical and Radiation Physics

The medical sector, covers approximately the 85% of the ionizing radiation applications in Greece. Aiming in the creation of a sustainable mechanism so as the persons involved in the radiation protection of the public, the workers and the patients during medical exposures are trained to pursue their duties effectively, GAEC organized the Medical Radiation Physics Course at Post-Graduate level, on regular basis, since 1961. Medical Radiation Physicists (M-RPs) are acting as Qualified Experts in the field of medical exposures according to MED 97/43 Euratom Directive and the Greek Law, and among their duties is to provide high standard education and training to occupationally exposed workers in medical radiation laboratories. In 1993, this course was upgraded to an Inter-University Post-Graduate Course established by law and was re-organized in its present form in 1998. As it has been already mentioned, the IPCMRP is based upon the close co-operation of five Greek Universities: Athens, Thrace, Ioannina, Crete and Thessalonica, the GAEC and the Research Center Democritos. The Course has been financially supported by the Greek Ministry of Education and the European Union, The Course given in the Greek language, is attended by about 10 to 15 physicists. Entering examinations include written examinations as well as personal interviews. The good knowledge of the English language is compulsory. Students are assigned to the cooperating universities in a proportional manner, considering the capabilities of each University, the regional needs for Medical Physicists and the preference of the students. The duration of the Course is five semesters. The first semester is devoted to lectures and practical exercises on fundamental topics in Medicine, Mathematics and Physics. The second semester includes specialised topics on Medical Radiation Physics concerning therapy and diagnosis, and Radiation Protection. Both semesters are conducted in the GAEC premises in Athens. The third and fourth semesters include foul time in service training at the University Hospitals. The fifth semester is devoted to research work and preparation of a diploma thesis. The successful completion of all educational stages leads to a Master's Degree. After being graduated they can participate in the examinations given by an authorized Committee in order the professional license of Medical Radiation Physicist to be granted by the Ministry of Health. Students wishing to acquire Ph.D degree may continue their studies at the University where they are assigned.

The principal goal of the IPCMRP is to provide a number of highly qualified Medical Physicists (M-RP) according to the national needs. These M-RPs should be capable of acting as Qualified Experts in the field of medical exposures according to MED 97/43 Euratom Directive and to provide high standard services within the medical radiation laboratories. In addition, following a specialized training, they can act as Qualified Experts according to the BSS 96/29 Euratom Directive, in radiation protection and safety of radiation sources in fields other than medical, covering relevant needs of the country. The aforementioned goal is achieved through the full use of the infrastructure of each one of the participating institutions, taking advantage of their scientific potential and experience.

GAEC also contributes to the Postgraduate Course on Medical Physics of the University of Patras, providing a one-week course on radiation protection and personnel dosimetry issues during the second semester. The principal goal of this Course is similar to that of the IPCMRP however it is more dedicated to Medical Physics rather to Medical Radiation Physics.

3. IAEA's Eastern European Region PGEC on Radiation Protection and Safety of Radiation Sources

GAEC being the IAEA's Regional Educational Center and in co-operation with the IAEA, organized and implemented through the Agency's TC Programme, the Eastern European Region PGEC on Radiation Protection and Safety of Radiation Sources. The Technical Co-operation and Nuclear Safety (NS) IAEA's Departments along with GAEC, are working closely together for its organization and implementation. The Course follows the IAEA's Standard Syllabus for the PGEC [2], is conducted in the English language and is held in Athens. The course ran for the first time in 2003 from 24 February to 27 June. The duration of this course was of 18 educational weeks and was attended by 21 participants from 19 European Countries of the Region (Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Georgia, Hungary, Latvia, Lithuania, FYROM, Malta, Republic of Moldova, Romania, Slovenia, Turkey, Federal Republic of Yugoslavia and Greece). The course is now running for a second time, from 3 October 2005 to 7 April 2006 with a duration of 23 weeks. It is attended by 19 participants among them three local and 16 coming from 10 European countries namely: Albania, Bosnia and Herzegovina, Croatia, Cyprus, Czech Republic, Lithuania, Portugal, FYROM, Serbia and Montenegro and Slovakia.

The Faculties of Medicine and Physics of the University of Athens, the Technical University of Athens, the Faculty of Medicine of the University Ioannina, main Hospitals in the area of Athens, and the Research Center Democritos, are supporting GAEC in this endeavor, providing their Laboratories and scientists to support the PGEC with state-of-the-art infrastructure and highly experienced Local Lecturers and Trainers.

About 40 local lecturers and six external lecturers support also the Course. Lecturers and trainers elaborated the standardized training material prepared by IAEA for both the PGEC and other specialized training events.

The purpose of the course is to meet the initial educational requirements on a graduate level for staff earmarked for positions in radiation protection and on the safe use and operation of radiation sources in the different fields of ionizing radiation in order to cover the relevant national and regional needs. The target audience is young professionals, needing to acquire a sound basis in radiation protection and knowledge of related safety fundamentals in order to become, in the course of time, leaders, and qualified experts in the countries of the Eastern European region. The goal of the Course, is also to produce a pool of trainers at national and regional level, in order to have sustainable training programmes, in a harmonized way consistent with the requirements of the Basic Safety Standards.

4. Organization or participation in national training programs on emergency preparedness and responce

The Greek Atomic Energy Commission (GAEC), according to its statutory role, is responsible for the emergency preparedness and response to nuclear and radiological events, and advices the Government on the measures and interventions necessary to protect the public. Among its responsibilities is to provide education and training to the people involved in the national emergency response plan concerning nuclear and radiological threats.
In this context, prior to, during and beyond the Athens 2004 Olympic Games, the GAEC provided training on radiation protection, prevention, detection, emergency preparedness and response to thousands of persons working for several national organizations involved in the plan. Within this frame, relevant courses, seminars exercises and drills, addressed to first responders, first line officers and members of scientific and technical supporting teams were organised by GAEC in cooperation with the military and civil services involved. The organization of the training programs included more than 3000 persons belonging to the military forces, the police , the coast guards, the fire brigade, the International Airport of Athens, the Olympic Games Security Division, the custom officers, the radiological installations, the network of collaborating laboratories for environmental monitoring as well as the first responders, the medical physicists, the medical personnel of the main hospitals and other non-uniformed scientific organizations.

5. Conclusions

It has been pointed out that education and training in radiation protection is one of the mechanisms and primary strategies of the GAEC for the application of the Safety Standards at national and regional level. To meet these goals, the further close co-operation among the Agency's Technical Cooperation and Nuclear Safety Departments, the GAEC and the local collaborating to the education and training on radiation protection institutions is needed.

References

[1] International Atomic Energy Agency, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Standards Series No. 115, IAEA, Vienna (1996).
[2] International Atomic Energy Agency, Postgraduate Educational Course in Radiation Protection and Safety of Radiation Sources - Standard Syllabus. Training Course Series 18, IAEA. Vienna (2002).

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