

# **TRAINING PROGRAMS OF WORKERS DEALING WITH NUCLEAR SECURITY: NATIONAL AND REGIONAL ASPECTS**

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**Abstract.** The Greek Atomic Energy Commission (GAEC) is the competent authority for radiation protection and nuclear safety in Greece. Among other responsibilities - regulatory, inspective and monitoring – GAEC has also the responsibility to provide education and training to people involved in the national emergency response plan against nuclear and radiological threats. On the occasion of Athens 2004 Olympic Games organization, GAEC provided training on radiation protection, prevention, detection, emergency preparedness and response to more than 3,000 personnel belonging to the national authorities involved. GAEC continues to organize in regular basis seminars addressed to the personnel of these organizations, in order to establish the sustainability of national operational capability on preparedness and response.

GAEC's work related to education and training issues has been acknowledged internationally and has been recognised since 2003 as the European Regional Training Centre of the International Atomic Energy Agency (IAEA) in radiation protection and since 2005 as the IAEA's International Training Centre in nuclear security respectively. In this framework GAEC has organised, in collaboration with IAEA, several international specialised courses in Nuclear Security for Front Line Officers, Remote Monitoring and Mobile Expert Support Teams (MESTs) and in radiological emergencies for first responders.

## **Introduction**

The Greek Atomic Energy Commission (GAEC) is the national competent authority for matters of radiation protection and nuclear safety. Among other responsibilities (regulatory, inspective and monitoring), it is responsible for the protection of nuclear and other radioactive materials and associated facilities and activities, as well as the prevention, detection and response in case of malicious acts involving nuclear and other radioactive materials out of regulatory control. In this framework, it shields the country from the danger of terrorist threat with radiological consequences and takes the suitable measures for the prompt and effective confrontation of incidents with entanglement of radioactive material.

A key element to fulfil its tasks is the provision of training courses related to the nuclear security, addressed to the personnel involved in the national response plan against nuclear and radiological threats such as the military forces, law enforcement, coast guards, fire brigade, Front Line Officers (FLOs), and Mobile Expert Support Teams (MESTs).

The aim of the present paper is the description of these training courses as well as, the GAEC's experience in providing training programmes addressed to workers, dealing with nuclear security, at the national, regional and international levels.

### **National training courses on Nuclear Security**

On the occasion of the Athens Olympic Games in 2004, and in order to prevent radiological threats and emergencies, the physical protection systems of the crucial radiological installations in the country have been upgraded [1]. Among others, the physical protection of radiation sources used in medical and industrial applications has been enhanced. Also, radioactivity detectors have been installed or distributed at the country's external borders (airports, seaports, land entry points) and radioactivity detectors and portable spectrometers have been distributed to the police and fire brigade. The use of this type of radiation detection equipment and the detection response required technical knowledge and specialized training. Thus, adequate training, technical support, and follow-up had to be provided to the personnel authorized to use these systems. The mechanism developed during that period had to be maintained and improved through continuous training and knowledge dissemination on the new techniques and methodologies.

At that time, GAEC provided training on radiation protection, prevention, detection, emergency preparedness and response to approximately 3000 of persons working for several national organizations involved in the national emergency plan (military forces, police, coast guards, fire brigade, first line officers, etc.). GAEC still continues to organize frequently and on regular basis seminars addressed to the personnel of these organizations, in order to assure the sustainability of national operational capability on preparedness and response.

As far as the nuclear security is concerned, courses on illicit trafficking of radiation sources were organized in 2004 at the customs offices around Greece, which were attended by approximately 400 first line officers. Since that time, refresher training courses have been implemented in order to maintain and strengthen the skills and knowledge of the custom officers on detection equipment and relevant procedures.

Moreover, the GAEC participates in training courses on nuclear security and emergency response exercises organized periodically by the organizations involved in the national emergency plan. In 2007 an extensive training of 504 police officers was organized by the police concerning the detection response to Chemical, Biological, Radiological and Nuclear (CBRN) threats. GAEC also contributes in the yearly training on transportation of radioactive material by air organized by the airport fire brigade.

### **Regional and international training courses on Nuclear Security**

GAEC since 2003, is the International Atomic Energy Agency's (IAEA) regional Training Centre for Europe for radiation protection and safety of

radiation sources. In this concept, apart from different regional specialised courses in the field, GAEC hosts the 22 weeks Postgraduate Educational Course on Radiation Protection and the Safety of Radiation Sources in the English language, co-organized and co-funded by IAEA. The syllabus of this course contains elements of nuclear safety and security

In addition, since 2005, GAEC is the IAEA's International Training Center in nuclear security. In this framework, GAEC has organized, ten international specialized courses for Front Line Officers (FLOs) and Mobile Expert Support Teams (MESTs) on Nuclear Security advanced detection equipment and on data networking, remote monitoring and sustainability of border Radiation detection equipment in collaboration with IAEA, and funded by the European Union.

At the regional level, and in the framework of the project "Strengthening the Capacity of the Radiation Protection and Nuclear Safety Regulatory Authority of Cyprus" that was assigned to the GAEC by the radiation protection section of the department of labor inspection of Cyprus, three educational seminars were organized in Cyprus concerning the field of nuclear safety and security.

- Fighting illicit trafficking of radioactive material
- Emergency response in case of radiological accident or other radiological event
- Radioactivity dispersion codes use (Hysplit, Hotspot)

### **Structure of training programmes related to nuclear security**

The training courses related to the nuclear security are addressed to the personnel of the military forces, police, law enforcement, coast guards, fire brigade, FLOs, and MESTs. The structure of these courses, takes into account that the main tasks of the workers dealing with security in case of a radiological/nuclear event are the:

- Detection of the presence of radiation using installed and/or portable detection instruments
- Localisation of the radiation source using portable detection instruments (e.g. Personal Radiation Detector)
- Identification of the radiation source using the Radionuclide Identification Device (RID).
- Isolation of the radiation source

The goal through this type of training courses is to strengthen Member States' capacities for prevention of, detection of and response to incidents involving Nuclear and other Radioactive Material. Therefore the main objectives of these courses are the following:

- Understand basic notions on health physics and radioprotection principles
- Introduce the international nuclear security legal instruments and the IAEA nuclear security program
- Raise awareness on illicit trafficking regional trends and patterns
- Enhance coordination between first responders and second line of defence

- Familiarize with relevant procedures
- Develop in-depth competence on prevention, detection and monitoring technology and equipment to be used in the area of nuclear security
- Extensive hands-on experience with instruments
- Practical applications

Concerning the outcome of these courses, it is expected that by completing the training course the participants are expected to:

- understand threats and risks of criminal and unauthorized uses of nuclear and radioactive materials
- be familiar with the relevant international and regional institutional frameworks and legal instruments, the IAEA's role and responsibilities in the area of nuclear security
- understand the basic principles of radiation, related health and safety principles and the legitimate uses of nuclear and radioactive material
- be familiar with the equipment and instruments currently available to monitor, detect and identify nuclear and other radioactive material.
- be familiar with the initial steps of response to incidents involving nuclear and other radioactive material and be familiar with the role of to the integration of the local response into a national response plan and global efforts to combat illicit trafficking
- be aware of basic needs for personnel training and other resources for effective detection and response and for the sustainable operation of equipment

### **ALARA elements in the syllabus of the training programmes**

These courses contain simple notions based on the ALARA principle since they are not addressed to people familiar with radiation.

In the case of a radiological/nuclear event, if the relevant procedures are not in place and followed, the dose received from a worker dealing with security (i.e. FLO), could be potentially high. It should be noticed that the security workers are not considered occupationally exposed workers and even more emergency workers, and therefore according to the international BSS, the dose limit of 1mSv/y for the members of the public is applied. In addition and in the context of the optimisation principle, dose constraints at levels below public dose limits should be applied. Thus the application of the ALARA principle in the procedures to be followed, is of vital importance, and consequently due consideration has to be given during the training of these workers in the understanding this principle. The procedures for FLOs performing activities during a nuclear security event, include the assessment phase (confirmation of an alarm indicating presence of nuclear or other radioactive material) as well as the response phase (recovery, safe handling and returning the material back to regulatory control). For example, alarm levels to radiation detection instruments, distances from the isolated sources and dose rate levels in working areas, have to be set in such a way that the FLO performing a nuclear security activity, do not exceed the established annual dose constraint.

## **Conclusions**

A key element to strengthen the country capacities for prevention of, detection of and response to incidents involving Nuclear and other Radioactive Material is the provision of training courses at national and international level, addressed to workers dealing with nuclear security. The structure of the courses must take into account the specific tasks of these workers in case of a radiological/nuclear event, and the relevant procedures to be followed. These procedures have to be based on the ALARA principle, given that these workers are considered to be members of the public. At the end these courses, the participants should be able to know how to deal with a situation involving radiation sources, and at the same time protect themselves from overexposure. The good knowledge of the procedures followed during an alarm (detection, localisation, identification), will help them to work efficiently and optimise the dose received. The knowledge of the three fundamental rules (time, distance, shielding) for self-protection and their practical application during the event is essential. In addition with the knowledge of the proper use and maintenance of the detection equipment, they will get the right measurements so as to evaluate properly the situation and take the appropriate actions according to the procedures.

## **References**

1. Kamenopoulou V., Dimitriou P., Hourdakis C.J., Maltezos A., Matikas T., Potiriadis C., Camarinopoulos L. Nuclear security and radiological preparedness for the Olympic Games, Athens 2004: Lessons learned for organizing major public events (2006) *Health Physics*, 91 (4), pp. 318-330.