



15th European ALARA Network Workshop and 5th EUTERP Workshop
Education and Training in Radiation Protection
Improving ALARA Culture
7-9 May 2014, Rovinj, Croatia

Greek Atomic Energy Commission initiatives with respect to education and training of outside workers

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Regulatory Requirements for E&T in Radiation Protection

The Greek Radiation Protection Regulations:

1. All persons involved in radiological procedures must have knowledge on RP (theoretical and practical training).
2. The competence of the personnel working in radiation facilities and activities must be checked before issuing (or renewing) the operation license of a facility
3. Provisions for QE/RPE, RPO, MPE – recognition requirements
4. GAEC issues certificates of competency on RP for occupationally exposed personnel (exams, cvs, personal interviews)
5. GAEC recognizes syllabi on RP.



ISO 29990:2010

An effective national programme on E&T in RP assumes that the E&T provider, has a well established Quality Management System (QMS).

The ISO 29990:2010 is

- a generic model for quality professional practice and performance
- a common reference for learning service providers in the: design, development and delivery of non-formal education



ISO 29990:2010

The QMS adopted is oriented to the vision and the mission of GAEC while focuses on:



ISO 29990:2010

E&T services

- (i) Determine the learning needs
- (ii) Design the learning Service
(e.g. learning outcomes, curriculum, teaching methods, teaching material, lecturers and participants criteria, exams)
- (iii) Provide the learning service
- (iv) Monitor delivery and evaluate of the learning service



Outside Workers

‘Outside worker’

means any exposed worker who is not employed by the undertaking (operator) responsible for the supervised and controlled areas, but performs activities in those areas, including, apprentices and students.

‘Outside Undertaking’ (employer)

is considered any natural or legal person, other than the operator, including member of his staff, performing an activity of any sort in a controlled area.

Outside Workers

Several issues have been raised with respect to outside workers involving:

- the monitoring of their doses, and who is responsible for summing the doses received at different facilities and checking if the annual dose limits have been exceeded;
- their education, training and information in radiation protection;
- the localization of any possible overexposure.



Outside Workers

- establish specific mechanisms for the reporting or authorization of the outside undertakings
- ensure that the system for individual radiological monitoring affords outside workers equivalent protection to that for exposed workers employed on a permanent basis.



Current situation in Greece

- There are **no nuclear facilities** and outside workers provide their services **mainly** to public and private **medical facilities**
 - ✓ Technicians performing the installation, maintenance and servicing of radiology, nuclear medicine and radiotherapy systems as well as the cyclotron installation
 - ✓ Staff providing assistance during interventional procedures (pacemaker and stent positioning, orthopedics etc)
 - ✓ Personnel undertaking the installation/replacement of radioactive sources
- The outside undertakings must be licensed to allow their employees to provide services in controlled areas
- GAEC in order to license the outside undertakings, performs on-site inspection at their installations to verify compliance with the existing requirements **in terms of** radiation protection
 - ✓ If compliance is verified, GAEC issues a license which is valid for 5 years
- During the on-site inspections at the installations of operators, GAEC ensures that the operators provide the required operational aspects of the radiation protection of outside workers that are directly related to the nature of their activities

Defining the Learning needs

What they know
and do

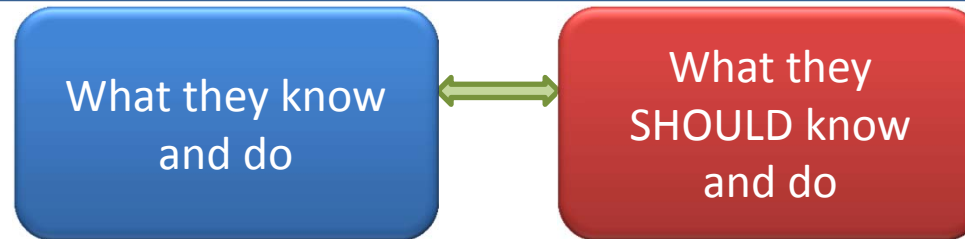
What they
SHOULD know
and do

On-site Inspections

Legislative framework

- Directive 2013/59/Euratom
- Directive 90/641/Euratom
- Directive 80/836/Euratom
- Government Gazette, Ministerial Decision No.9087(FOR) 1004: “Protection in practice of outside workers exposed to ionizing radiation during their activities in controlled areas”
- Hellenic Radiation Protection Regulations

Defining the Learning needs



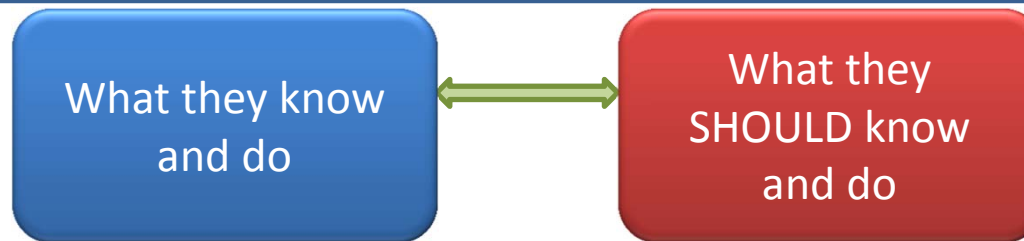
On-site Inspections

- Some outside workers:
 - ✓ Do not use their electronic dosimeter
 - ✓ Own a radiation passport without having an electronic dosimeter
 - ✓ Use their personal electronic dosimeter as survey meters
 - ✓ Do not keep their radiation passport informed

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- Lack of appropriate training on RP as well as ALARA/Safety culture

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Defining the Learning needs



On-site Inspections

- Some outside workers:
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 - ✓ Use their personal electronic dosimeter as survey meters
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- Lack of appropriate training on RP as well as ALARA/Safety culture
- The involved parties (undertakings, workers, operators) are unaware of the existing legislative framework or are not fully aware of roles and responsibilities

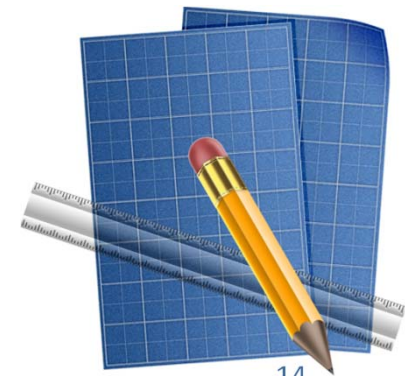
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Design of a training programme

Parameters of the training programme

- **Duration:** 8 hours
- **Educational level of participants:** Secondary school at least
- **Lectures qualifications:**
 - ✓ GAEC has a pool of highly qualified and experienced lecturers (most of them are Medical Physicists)
 - ✓ Cooperation with universities and research centers is always possible
- A **syllabus** was decided
- **Lesson plans** were prepared
- **Learning objectives:**
 - ✓ To be aware of the harmful effects of radiation
 - ✓ To recognize radiation risks in workplace
 - ✓ To adopt radiation protection 'good practices'
 - ✓ To understand their role and responsibilities
 - ✓ To develop a 'safety culture'



Syllabus

1. Fundamentals → 4 h

- 1.1 The physics of ionizing radiation
- 1.2 Ionizing radiation detection systems
- 1.3 Dosimetry
- 1.4 Biological Effects of ionizing radiation
- 1.5 Radiation Protection System

The current legislative framework regarding outside workers
Licensing procedure for outside undertakings

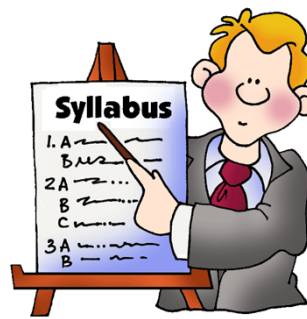
2. Practical aspects of Radiation Protection for outside workers → 4 h

2.1 Diagnostic and Interventional Radiology

→ *Lesson plan example*

2.2 Nuclear medicine

2.3 Radiotherapy



Lesson Plan

2.1 Diagnostic and Interventional Radiology

Type	Classroom based training
Learning Outcome	Basic awareness of the principles of radiation protection and the application of best practices in diagnostic and interventional radiology
Learning Objectives	The participant will be able to do the following: • Apply basic concepts of radiation protection (i.e. the behavior of the factors of time, distance, shielding) • Apply practical methods for reducing doses • Be able to distinguish good from bad practices
Content	• Radiation Protection Principles (distance, time, shielding) • Scattered radiation and leakage radiation • Applying RP Principles – Best practices (control room, shielded doors, installation of new systems, lead apron, thyroid collar, glasses, personal dosimeter) • Examples of RP bad practices • Practices reducing the dose exposure of outside workers • Accidents
Duration	1 h
Equipment	Power Point, video projector
Available Material	Lecture Notes, Notebook (available via www.gaec.gr)

Provision of the programme

- 3 seminars have been conducted
 - ✓ 2 in Athens, 1 in Thessaloniki
- 6 different lectures (Medical Physicists)
- 60 outside workers out of 239 registered in the National Radiation Protection Database attended the seminars



Evaluation of the programme

- Feedback from the participants by filling a questionnaire
- Feedback from the lecturers by filling a questionnaire
- Questions are related inter alia to the
 - ✓ Structure of the seminar
 - ✓ Presentations
 - ✓ Learning objectives
- Mean results >4.5 for all the questions

		Ερωτηματολόγιο ικανοποίησης συμμετεχόντων & προτάσεις βελτίωσης				
«Ακτινοπροστασία στους εξωτερικούς εργαζόμενους» «Ημερομηνία & τόπος διεξαγωγής»						
Ερωτηματολόγιο						
Κυκλώστε έναν αριθμό που περιγράφει καλύτερα τη γνώμη σας σύμφωνα με την παρακάτω κωδικοποίηση: 1= διαφωνώ απόλυτα, 2= διαφωνώ, 3= ουδέτερα, 4= συμφωνώ και 5= συμφωνώ απόλυτα						
1.	Το σεμινάριο ήταν καλά οργανωμένο	1	2	3	4	5
2.	Οι στόχοι του προγράμματος επιτεύχθηκαν	1	2	3	4	5
3.	Το σεμινάριο ήταν χρήσιμο για τη γενική μου ενημέρωση	1	2	3	4	5
4.	Το σεμινάριο ήταν χρήσιμο για το αντικείμενο της εργασίας μου	1	2	3	4	5
5.	Το σεμινάριο με βοήθησε να κατανοήσω τα προβλήματα που αντιμετωπίζω στην εργασία μου	1	2	3	4	5
6.	Το σεμινάριο θα με βοηθήσει να είμαι αποτελεσματικότερος/η στην εργασία μου	1	2	3	4	5
7.	Θα ήθελα να συμμετέχω ξανά σε παρόμοιο σεμινάριο	1	2	3	4	5
8.	Θα σύστηνα στους συναδέλφους μου να παρακολουθήσουν το σεμινάριο	1	2	3	4	5
9. Η συνολική διάρκεια του σεμιναρίου ήταν:						
Πολύ μεγάλη		Μεγάλη		Κατάλληλη		Μικρή
Πολύ μικρή						
10. Το επίπεδο του σεμιναρίου σε σχέση με τις γνώσεις, τις δεξιότητες και την επαγγελματική σας εμπειρία ήταν:						
Πολύ χαμηλό		Χαμηλό		Κατάλληλο		Υψηλό
Πολύ υψηλό						
11. Αξιολογήστε το εκπαιδευτικό υλικό ως προς τα ακόλουθα: (Παρακαλούμε χρησιμοποιήστε κλίμακα 1-5 με άριστα το 5)						
11.1	Δομή					
11.2	Παρουσίαση					
11.3	Ορθότητα περιεχομένου					
11.4	Πληρότητα υλικού					

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Conclusions

- The initiative taken was considered successful and that contributes significantly in the enhancement of the national radiation protection system and that supports the development of ALARA/Safety culture among the involved parties
- Initiatives like this are going to be continued
- More actions like distance learning courses, dissemination of informative material, continuous communication with related professional bodies should also be taken

Thank you very much for your attention!!!

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