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Education and Training in Radiation, Transport and Waste Safety Newsletter

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Focus on Africa

A Newsletter issue for the region

The IAEA Strategic Approach to Education and Training in Radiation, Transport and Waste Safety (2011–2020)[1] provides a framework for establishing a sustainable education and training infrastructure in Member States that addresses national needs for building and maintaining competence in radiation, transport and waste safety that is consistent with IAEA Safety Standards.

For this purpose, IAEA's General Conference[2] has encouraged Member States to develop a national strategy for education and training, underlining the fundamental importance of sustainable programmes for building competence in radiation, transport and waste safety, as a key component of safety infrastructure. Furthermore Member States that receive assistance from IAEA are obliged to apply IAEA Safety Standards which require, inter alia, governments to establish a **national policy and strategy for safety**, including **provisions for acquiring and maintaining the necessary competence nationally for ensuring safety**.

IAEA's Division of Radiation, Transport and Waste Safety is assisting Member States to develop their own national strategies in Africa via the Regional project RAF/9/04 on **"Strengthening Education and Training Infrastructure, and Building Competence in Radiation Safety"**, which includes, inter alia, **Regional Workshops on National Strategies** for education and training in radiation, transport and waste safety (see below).

AFRA Regional Designated Centres, in Algeria, Ghana and Morocco, equivalent to the **IAEA's Regional Training Centres** (RTCs) present in all the other regions, are key partners in the African region.

[1] Note to the IAEA Board of Governors and General Conference '2010/Note 44'.
[2] IAEA General Conference Resolution GC(56)/RES/9

Building Sustainable Education and Training Infrastructures in Radiation Safety

The IAEA Secretariat and Member States in the Africa region have jointly designed the regional project RAF/9/048 "Strengthening Education and Training Infrastructure and Building Competence in Radiation Safety" (2012-2015).

Objective

To strengthen radiation safety through the development of sustainable and effective education and training programmes in radiation safety that are based on identified needs; and by developing national and regional expertise in radiation safety.

Outcome

National radiation safety infrastructures are strengthened through the availability of appropriately educated personnel, addressing the needs of the countries.

Outputs

Personnel are educated and trained in the relevant IAEA Safety Standards (including IAEA General Safety Requirements Part 3, GSR Part 3).
National strategy for education and training in radiation, transport and waste safety is established.

Project Activities

Competence in radiation protection is strengthened through the attendance at the IAEA Postgraduate Educational Course in Radiation Protection and the Safety of Radiation Sources (PGEC). These courses are hosted at the AFRA Regional Designated Centres (see page 5).
Train-the-Trainers workshops are organized for Radiation Protection Officers (RPOs). The Train-the-Trainers modality is aimed at developing communication skills as well as familiarizing participants with the IAEA training material with a view to building a core of national trainers in radiation protection. The target audience of the Train-the-Trainers workshops are normally the trainers of RPOs.

Radiation Protection Officer is defined in IAEA Safety Standards as a 'person technically competent in radiation protection matters relevant for a given type of practice who is designated by the registrant, licensee or employer to oversee the application of relevant requirements'

Regional workshops are organized to disseminate the IAEA methodology to establish the national strategy.
Expert missions can also be requested by Member States to receive direct assistance and advice on how to establish a national strategy.
Experiences in developing the national strategy are shared during workshops and progress made is monitored via the education and training module (Thematic Safety Area 6: TSA6) of the Radiation Safety Information Management System (RASIMS).

RASIMS is an IAEA web-based platform that enables Member States and the Secretariat to jointly collect, analyse and view information regarding the national infrastructure for radiation, transport and waste safety.

Representatives of the AFRA Regional Designated Centres participate in the annual meetings of the Steering Committee on Education and Training in Radiation Protection and Waste Safety (Newsletter issue No. 1) and the PGEC directors.

In Table 1 the time schedule of the project activities is summarized. The regional workshops (highlighted in green) organized in 2012 are presented on pages 3-4.

IAEA Staff

Technical Officer: Mr Andrea Luciani (Department of Nuclear Safety and Security, Division of Radiation, Transport and Waste Safety); Project Management Officer: Mr Mickel Edwerd (Department of Technical Cooperation, Division for Africa).

Project Activities	Year			
	2012	2013	2014	2015
Education of personnel through the IAEA PGEC	☑	☑	☑	☑
Train-the-Trainers workshop for Radiation Protection Officers (English)	☑	☑	☑	
Train-the-Trainers workshop for Radiation Protection Officers (French)		☑		☑
Regional workshop to introduce IAEA methodology on establishing a national strategy (English, French)	☑			
Expert missions to assist Member States to develop/refine the national strategy	☑	☑	☑	☑
Regional workshop to share experiences and report on progress in developing national strategy. Review and update of information related to education and training in RASIMS (English, French)		☑		☑
Participation of representatives of the RDCs in the annual meetings of: IAEA Steering Committee on Education and Training in Radiation Protection and Waste Safety; PGEC Directors	☑	☑	☑	☑

Table 1: Summary of project activities and time schedule (as of January 2013).

Regional Workshops on National Strategies

Two IAEA regional workshops on **"Establishing a national strategy for education and training in radiation, transport and waste safety"** were organized for the African region in 2012, one in English and the other in French.

Background

According to the IAEA Strategic Approach to Education and Training in Radiation, Transport and Waste Safety 2011–2020, Member States are expected to assume ownership of the process for establishing sustainable education and training infrastructures to achieve the desired level of competence. The sustainability will be ensured through the development and implementation of national strategies to strengthen education and training in radiation, transport and waste safety, considering the needs at national level and optimizing the available resources across all the Member States in the region. An approach based on four-interlinked phases (Figure 1), where the outcome of one phase is the starting point for the next phase, will be adopted: identification of the training needs; design of a national training programme; development and implementation of the national training programme; evaluation and feedback.

Location, Date, Language

- Botswana, in collaboration with the Radiation Protection Inspectorate; 4-6 June 2012, English;
- Morocco, in collaboration with the Centre National de l'Energie, des Sciences et des Techniques Nucléaires, 16-18 May 2012, French.

Purpose

- To provide Member States with a general understanding of the IAEA methodology for developing a national strategy for education and training in radiation, transport and waste safety
- To familiarize Member States with the relevant IAEA safety standards and guidance, providing requirements for education and training in radiation safety and supporting the development of national strategies;
- To collect from Member States preliminary information for the development of national strategies, including regulatory framework for education and training, human resources and training infrastructures in radiation safety

Scope and Nature

The workshops were organized into plenary sessions and working groups. Experts gave presentations and reviewed the work of the breakout groups. The participants gave presentations on national regulatory frameworks for education and training and on human resources and training infrastructures in the field of radiation safety.

The main reference documents for the workshops were (Figure 2):

- Governmental, Legal and Regulatory Framework for Safety, IAEA General Safety Requirements Part 1, GSR Part 1;
- Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards - Interim Edition, IAEA General Safety Requirements Part 3, GSR Part 3;
- Building Competence in Radiation Protection and the Safe Use of Radiation Sources, IAEA Safety Guide, RS-G-1.4;
- Draft guidance on the IAEA methodology for establishing a national strategy for education and training in radiation, transport and waste safety.

Two regional workshops are planned for 2013: Algeria, 9-13 June 2013 (French); and Ghana 10-14 June 2013 (English)

Fig.1: Phases to establish and maintain a national strategy for education and training in radiation protection.

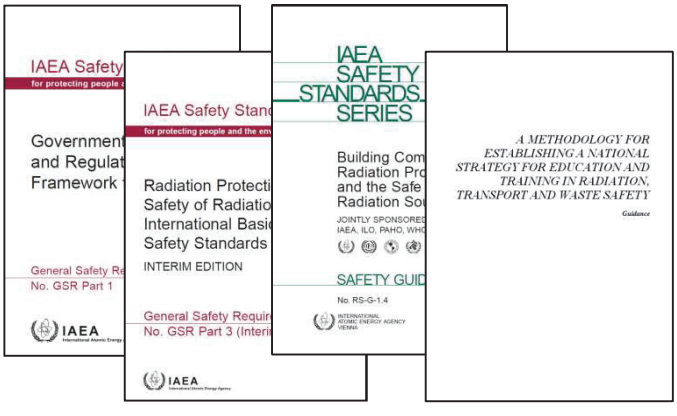

Fig.2: Reference IAEA Safety Standards and documents for the workshops: GSR Part 1, GSR Part 3, RS-G-1.4, Draft guidance for establishing a national strategy.

Participants

In total 42 participants attended the workshops from 27 countries. The lecturers and facilitators were from the IAEA Regional Training Centres in the region (Algeria, Ghana and Morocco), plus IAEA staff.

Workshop in Botswana (English):

Workshop Facilitators

Cyril Schandorf (Ghana), Andrea Luciani (IAEA)

	Participants
Benin	AYELO, Ahoumenou Paul
Botswana	CHIMIDZA, Samuel PHUTIETSILE, Kabo Joseph
Central African Republic	TOUABOY, Bertrand
Ghana	BOADU, Mary FAANU, Augustine
Kenya	NGANGA, Michael Lavi Muia
Lesotho	KANONO, Mathapelo Germina KOETJE, Thabo Adolph
Malawi	LAKI, Yusuf SENGANIMALUNJE, Thomas
Mauritius	SEEBURRUN, Vanisha
Namibia	TIBINYANE, Axel
Seychelles	MELLON, Evans Benjamin
Sierra Leone	KONGO, Josephus Jibao
Sudan	IBRAHIM AWADELKARIM ALKHAWAD, Safaa MUSA, Isam Salih Mohamed
Tanzania	SHAO, Didasi Wilirick
Uganda	NAKATUDDE, Rebecca
Zambia	CHILULU, Abigail SIWILA, Boster Dearson
Zimbabwe	CHIPURU, Justice

Workshop in Morocco (French):

Workshop Facilitators

Abdelmajid Caoui (Morocco), Michèle Coeck (Belgium), Abdelkader Noureddine (Algeria)

Country	Participants
Algeria	ABDENASSER, Ghezal
Burkina Faso	SAM (NÉE ZANGRE), Sidnoma
Central African Republic	GUIDO, Gilbert
Cameroon	BEYALA ATEBA, Jean Félix CHAKAM TAGHEU, Pulcherie Julie
Gabon	BOUTOUNDOU DOULEGOU, Aime Brice LEKOGO EDZOUGOU, Martine
Côte d'Ivoire	MONNEHAN, Georges Alain
Madagascar	RASOLOFOSON, Nirina Gilbert
Mauritania	DEIDA, Ahmed Bezeid OULD MOULAYE AHMED, Salah
Morocco	ALLACH, Abderrahim BENTAYAA, Lalla Kenza EL GAMOUSSI, Rachida HAKAM, Oum Keltoum OUBELAID, Brahim
Niger	DJIBO, Ali
Senegal	FAYE, Ndeye Arame Boye MBODJ, Mamadou
Dem. Rep. of Congo	WOTO MAKONTSHI, Léonard

Workshop summary

Member States were informed about the IAEA methodology for establishing a national strategy for education and training. Preliminary information on which to start identifying needs i.e. data on practices and activities in each State, as well as details of national legislation and regulations for education and training in radiation, transport and waste safety. Participants reviewed the IAEA draft guidance on a methodology to establish a national strategy, and proposed a road map for national stakeholders when establishing a national strategy.

Fig.3: Photographs from the workshops: work in groups in Botswana (left) and Morocco (right).

IAEA Regional Training Centres: AFRA Regional Designated Centres

The inter-governmental African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA) is one of the regional agreements under the IAEA. AFRA entered into effect in 1990 and since then, is fostering sustainable regional self-reliance and mutual assistance in Africa through, inter alia, the recognition of regional institutions in high priority fields (AFRA Regional Designated Centres (RDCs)), including radiation protection. AFRA has established a procedure for the recognition of RDCs for education and training in radiation protection that includes the IAEA Education and Training Appraisal (EduTA) mission and the conclusion of a Memorandum of Understanding between the country and AFRA. In regard to that, the RDCs are equivalent to the IAEA Regional Training Centres (RTCs) for education and training in the field of radiation protection present in all the other regions. The IAEA RTCs are centres that provide training in collaboration with IAEA. Within the IAEA Strategic Approach 2011-2020 the RTCs are assigned a key role in the development of competence in the region. This includes collaborating with IAEA to disseminate the methodology for establishing a national strategy for building competence through education and training to Member States in the region. The RTCs in Africa are hosted in Algeria, Ghana and Morocco. They provide training and support to Member States in English and French.

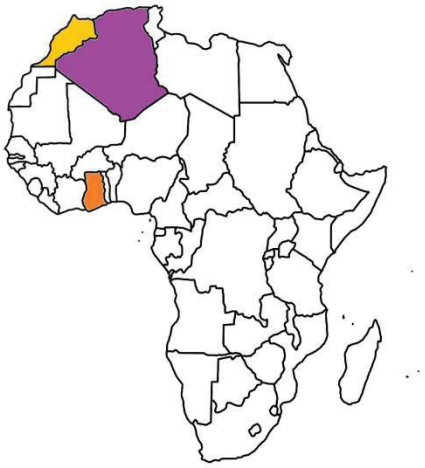

Fig.4: IAEA Member States hosting AFRA Regional Designated Centres for education and training in radiation protection.

ALGERIA
Centre de Recherche Nucleaire d'Alger (CRNA)

Introduction

Education and training programmes on radiation protection, nuclear safety and medical physics at undergraduate and postgraduate level have been provided in Algeria since 1976. On the basis of the gained experience and according to the strong national commitment in developing sustainable education and training programmes, Algeria resolves to build and strengthen competence in radiation protection at national level and regional level making use of the capacities and capabilities of the research centres of COMENA (Commissariat à l'énergie atomique) and by establishing National Institute in charge of education and training in Nuclear Engineering (IAGN).

COMENA is the regulatory body and is supported by CRNA as technical scientific and support organization. CRNA provides the regulatory body with services and expertise on radiation control of facilities, internal and external dosimetry monitoring, isotopic analysis, radioactive waste management, radioecological studies of the environment, calibration services, medical physics, and emergency response system. The CRNA also contributes to provide training in radiation protection for the end-users of the sources. In 2007 the CRNA was designated as an AFRA RDC on secondary standard dosimetry for the African French-speaking countries. After the EduTA mission conducted in Algiers on 17-21 October 2010, CRNA was also designated in 2011 as an AFRA RDC for education and training in radiation protection.

Physical infrastructures

The CRNA is a research institution in the field of physics, nuclear techniques, nuclear applications, radiological physics, environment, nuclear and radiation safety, and radioactive wastes. Facilities are available for providing services and conducting research specifically in the field of radiation protection, including individual monitoring of internal and external exposure, workplace monitoring, and radioanalytical methods. Equipment and facilities include:

- Van der Graff accelerator;
- neutron generator;
- pilot Co-60 gamma irradiator;
- characterization laboratories;
- Secondary Standard Dosimetry Laboratory.

CRNA is also equipped with 3 classroom for 20 persons, lecture room for more than 200 persons, library with more than 15 000 documents, 100 scientific journals and on-line to electronic journals.

Human resources

The CRNA is deeply involved in academic activities in nuclear fields, collaborating with academic institutions in the master and doctoral programmes (in total 33 masters

and PhDs, 16 of which in the fields of radiation protection, medical physics, nuclear safety and health physics). More than 40 staff (researchers, engineers and technicians) is available for providing and supporting training. CRNA has hosted from 18th November 2012 to 11th April 2013 the first edition of the IAEA PGEC in Algeria with 20 participants from 11 African countries. 60 lecturers have been involved for the course, mainly from CRNA and from other institutions and organizations, including external experts supported by IAEA.

Fig.5: Secondary Standard Dosimetry Laboratory (SSDL).

Fig.6: Whole Body Counter (WBC).

Highlights

GUIDELINES FOR THE DEVELOPMENT AND IMPLEMENTATION OF NATIONAL STRATEGY IN HUMAN RESOURCES DEVELOPMENT (HRD)

Human Resources Development entails the following activities: assessment of needs in HRD in nuclear science and technology; design of a strategic plan for HRD; promoting national network concerning HRD; establishing and updating an HRD data bank and building capacity in education and training.

These activities can be effectively implemented by establishing a national strategy in the field of HRD, with a strategic plan for its implementation, monitoring mechanisms, evaluation procedures, and, when necessary, corrective actions.

VISION

The COMENA is ready to develop the appropriate infrastructures, particularly through the IAGN, with the aim to strengthen and expand the education and training programmes in the upcoming years (by 2015) with the purpose to educate and train in various fields of nuclear science and technology. The objective is to cope with national needs and bridge the gap in the required human resources, to face the new challenges that lie ahead.

IDENTIFICATION OF PRIORITIES IN THE FIELD OF HRD

The high-priority areas in need of HRD Post Graduate programmes include human health, sustainable energy development, nuclear sciences and technology, radiation and waste safety, radiation protection, health physics, nuclear safety and security.

The national strategy in terms of education and training is mainly based on the creation of the IAGN, the implementation of an appropriate cooperation framework at national level with industry, the strengthening of the regional cooperation as an AFRA RDC and within AFRA-NEST, the development of an international cooperation in nuclear sciences. IAGN will respond to the national needs to develop human resources highly qualified in nuclear safety and technology.

GHANA
School of Nuclear and Allied Sciences (SNAS)

Introduction

The School of Nuclear and Allied Sciences, University of Ghana, was selected as an AFRA Regional Designated Centre (RDC) for education and training in radiation protection in October 2011 for the English speaking countries in Africa, after the EduTA mission conducted in Accra on 14-16 July 2010.

The Terms of Reference (ToR) of the centre are:

(i) to provide theoretical and practical training in radiation protection;
(ii) to organize regional IAEA Post Graduate Educational Course on Radiation Protection and Safety of Radiation Sources (PGEC);
(iii) to provide advisory services on specific elements of the thematic safety areas, on request from Member States;
(iv) to complement regional efforts for the promotion of basic requirements for the safety of radiation sources.

The collaborating institutions are the Department of Nuclear Safety and Security of the School of Nuclear and

Allied Sciences, and the Radiation Protection Institute of Ghana Atomic Energy Commission.

Physical infrastructures

The training facilities include:

- 30 kW miniature neutron source reactor used for elemental analysis, research and teaching;
- 1850 TBq Co-60 gamma irradiator source for radiation processing, research and teaching;
- 185 TBq Co-60 gamma source for radiation therapy at the Korle Bu Teaching Hospital;
- 201 TBq Co-60 gamma source for radiation therapy at the Komfo Anokye Teaching Hospital;
- Nuclear Medicine Department at the Korle Bu Teaching Hospital;
- Two 185 GBq Cs-137 gamma sources for brachytherapy at the two teaching hospitals in Ghana;
- 3.7 TBq Ir-192 gamma source for industrial radiography;
- 740 GBq Am/Be neutrons source;
- 5 MeV Linear X ray accelerator and 101 TBq Co-60 source for scanning of containerized goods at Tema port;
- National radioactive waste management facility;
- Harshaw TLD 6600 reader and accessories;
- Gamma spectrometry systems and accessories;
- Gross alpha and beta counter;
- Alpha spectrometry system and accessories;
- Safety assessment and quality control equipment;
- Classrooms at SNAS and Nuclear Security Support Centre for education and training.

Human resources

Prof Cyril Schandorf (PhD Physics); Prof G. Emi-Reynolds (PhD Physics); Prof E.O. Darko (PhD Physics); Prof J.H. Amuasi (PhD Medical Physics); Dr Godsway Banini (PhD Physics); Dr J.K. Amoako (PhD Physics); Dr Mary Boadu (PhD Physics); Dr K. Danso (PhD Materials Science); Dr J. Yeboah (PhD Physics); Dr Augustine Faanu (PhD Environmental Science), Dr Joseph Gbadago (PhD Radiation Protection), Mr O.C. Oppong (Msc. Physics), Mr E. Glover (MPhil. Physics), Mr J. Owusu Banahene (MPhil. Medical Physics), Mr David Kpeglo (MPhil. Radiation Protection).

Major Events

In 2012, the SNAS hosted:

- Four IAEA fellowship training events;
- Six national training events;
- Two regional training courses;
- PGEC with 21 participants from the region (5 November 2012 to 5 April 2013);
- 2-year course on MPhil. Radiation Protection Programme (7 Students);
- 2-year course on African MSc in Nuclear Sciences and Technology: Radiation Protection and Health Physics Options (6 Students)

SNAS is in the process of establishing a national policy for education and training in radiation protection as well as the framework for strategic and sustainable approach to education and training for regulators, radiation protection officers, qualified operators, qualified experts and health professionals. Two working groups have been established for this purpose.

The capability and the capacity developed by SNAS to build competence in education and training in radiation protection is at the disposal of the Member States in the region who may need such services in line with the ToR of the Centre.

Fig.7: Headquarter of the School of Nuclear and Allied Sciences, University of Ghana.

MOROCCO
Centre National de l'Energie, des Sciences et des Techniques Nucléaires (CNESTEN)

Introduction

The National Centre for Nuclear Energy, Science and Technology (CNESTEN), established in 1986, is the only integrated nuclear training centre in the field of nuclear and technology in Morocco supported by the Government. In addition to its training activities, CNESTEN also carries out research and development activities and provides technical support to governmental agencies as well as promoting utilization of nuclear technology to meet national needs in various socio-economic sectors such as health, water, environment, agriculture, industry, and mining.

With regards to education and training activities, CNESTEN provides a wide range of education and training courses and workshops for domestic and foreign personnel from the utilities, regulatory bodies, industry, universities and research and development institutes. Each year, around 1000 professionals and students attend these

courses and workshops, of which 20% are from foreign countries.
The training courses and workshops cover a great variety of fields including non-destructive testing, radiation protection, physical protection, emergency preparedness and response, environment protection and monitoring, nutrition, isotope hydrology, Triga reactor.
These activities are performed in conjunction with universities and international organizations, mainly the International Atomic Energy Agency (IAEA) and the African Regional Cooperative Agreement for Research, Development & Training related to Nuclear Science and Technology (AFRA). Under the umbrella of AFRA, CNESTEN was designated in 2011 as an AFRA RDC for education and training in radiation protection after the EduTA mission conducted in Rabat on 10-12 November 2010.
CNESTEN has hosted 7 Postgraduate Educational Course in Radiation Protection and Safety of Radiation Sources (PGEC) since 2000. About 157 professionals from 19 French-speaking African countries have participated in this course.

Physical Infrastructures

- Triga Mark II reactor, 2 MW
- Waste management facility
- Radioisotopes production facility
- Isotopic hydrology laboratory
- Environment monitoring laboratory
- Dosimetry laboratory
- NDT laboratory
- Electronic and nuclear instrumentation laboratory
- Visio conference facilities, conference rooms, and lecture rooms with multimedia teaching equipment

Human resources

CNESTEN has 264 staff of which 87 are university graduates and engineers, 80 are technicians, and 97 are for administrative and financial support.
CNESTEN has access to a wide range of professors, engineers, inspectors, doctors and practitioners in different fields from different collaborating institutes. These institutes are the Mohammadia Engineer School, National Regulatory Body for Radiation Protection (CNRP), National Institute of Agronomic Research (INRA), and the universities and hospitals in Morocco.

Fig.8: Group photo of the participants in the 7th edition of the PGEC in Morocco.

Highlights

After the regional workshop on establishing a national strategy for education and training in radiation, transport and waste safety held in Rabat from 16th to 18th May 2012, initiatives were taken to establish a national committee to promote decision-making process for the development of the national strategy on education and training in radiation protection. The main relevant documents were translated to French to better disseminate knowledge among all stakeholders and meetings were also held between CNESTEN, the national regulatory body and universities.
Three specific workshops are planned to circulate the IAEA methodology for developing a national strategy for education and training in radiation, transport and waste safety among professionals from the health, industry and education sectors. Through these workshops, potential members of the national committee may be nominated. The terms of reference of the committee will also be discussed and developed in the workshops.

Impressum

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