

Activities of the Moroccan Association of Radiation Protection as one African experience in the field of associative work.

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1. Introduction

Radiation is an inescapable part of the natural environment, and it is also produced artificially with a variety of unique applications in health, environmental studies, industry, etc. It is evident that our present and future lifestyles are unsustainable without peaceful applications of radiation technologies. Events around the world continue to indicate an increasing need for nuclear and other renewable energy sources. However, in order to derive the full benefits of nuclear energy and radiation technologies certain protective measures must be established and used correctly.

The peaceful applications of nuclear energy, together with all their potential benefits for mankind, are often associated in the public mind with the problems of the proliferation of nuclear weapons and nuclear war. This is also, used in sometimes for political goals. This association is due to the fact that the materials, know-how and skills required to manufacture nuclear weapons are not always distinct from those used to produce electricity or undertake research. Another reason is that, from a historical perspective, military applications preceded the peaceful use of nuclear energy. Actually, Japan's nuclear accidents sent and continue to send shockwaves round the world,

Radiation protection as an essential component of nuclear safety must be known by all operators in the nuclear field and general public. It should be introduced in educational programs and supported by continuous training for workers in areas using ionizing radiation. NGOs can play an important role in sensitizing society to know, nuclear, benefits and interest for its use, the risks in case of bad use or accident. The RP culture means the way in which RP is founded, regulated, managed, performed, preserved, and perceived in the workplace, and every day's life and reflects the attitudes, beliefs, perceptions, goals, and values that all parties involved share in relation to RP. Protection culture is necessary to implement safety.

In this presentation, I will give a brief overview of nuclear power in Africa, then in Morocco. I will give an idea of the associative work in Africa, the main associations in radiation protection in Morocco before citing, as example, the actions of the Moroccan Radiation Protection Association during 10 years of its existence.

Key words : Radiation protection, AMR, IRPA, Associative work, Ionizing radiations

2. Nuclear in Africa

According to the recommendations of a high level African Regional Conference on the contribution of Nuclear Energy to Peace and Sustainable Development held in January 2007 in Algiers, which was adopted by the Executive council of Ministers during the 8th African Union (AU) summit of January 2007, it is important for African countries to promote the acquisition of scientific know-how and the necessary infrastructure for the peaceful use of nuclear energy

Several African nations are seriously considering nuclear power. South Africa has been operating nuclear power stations since 1984. Indeed, "nuclear renaissance" has become a catchphrase worldwide, but there's hardly a consensus regarding nuclear power's benefits. Every country's energy mix involves a range of national preferences and priorities that are reflected in national policies. Hence, these policies represent a compromise between expected energy shortages, environmental quality, energy security, cost, public attitudes, safety and security, available skills, and production and service capabilities. Relevant national stakeholders must take all of these into account when formulating an energy strategy. A nuclear power infrastructure includes manufacturing facilities, complex legal and regulatory frameworks, expanded institutional measures to ensure safety and security, and appropriate human and financial resources.

Numerous radiation protection societies have been established in Africa and other countries that introduced nuclear applications, or those who believe, are called to create their societies. The role of these societies is to help authorities, operators in the field at all levels, and the public to know and avoid potential hazards associated with the use of ionizing radiation. This work is done through:

- To put in place an appropriate education and training program as a mechanism for the implementation of the BSS and other relevant safety standards.
- To encourage appropriate knowledge and understanding to promote and sustain safe working practices.
- To promote the continuous exchange of information between member states as an essential mechanism for establishing and maintaining safety.

- Assist the African states in exercising control over nuclear activities to protect the public and the environment from the hazards of ionizing radiation.

3. What is the position in Morocco ?

Morocco has a 2 MW Triga research reactor at meddle between cites of Rabat and kenitra (CNESTEN). In January 2010 the government announced plans for two 1000 MWe nuclear reactors to start operation eventually after 2020.

Morocco has signed a co-operation agreement with the United States of America, the African Regional Co-operative Agreement for Research, Development and Training related to Nuclear Energy (AFRA), as well as numerous treaties and conventions.

Areva signed an agreement with Morocco's Office Cherifien des Phosphates (OCP) to investigate recovery of uranium from phosphoric acid. The amount of uranium in Morocco's phosphates is reported to be very large.

France and Morocco signed in 2010 a cooperation agreement on civilian nuclear power development for the "development of peaceful uses of nuclear power by Morocco",

Morocco has various nuclear-related institutions. There are of both a technical and a legal nature, and include:

National Centre for Energy and Nuclear Science and Technology (CNESTEN) : it is a publicly owned organisation that was created in 1986. Its principal roles are to develop nuclear energy research and to promote its application in various socio-economic sectors, to help in setting up a nuclear power programme and to provide training in a variety of nuclear fields. CNESTEN's main infrastructure is the Nuclear Research Center of Mamora which consists of a 2 MW TRIGA Research Reactor and laboratories specialized in various technical and socioeconomic fields

National Centre of Radiation Protection (CNRP) is in charge of the control, the inspection and the authorization of the use of the radioactive sources. The CNRP is a ministry of health department and operates in the areas of medicine, industry, agriculture, research, etc... This centre is the counterpart of the WHO (World Health Organization) and provides training in radiation protection in collaboration with IAEA.

National Safety Authority (ASN) The nuclear safety authority is a Department of the Ministry of Energy, Mines, Environment and Water. As regulatory body the NSA deals with the control,

inspection and authorization of nuclear installations and played a major role in elaborating national regulations (Laws, decrees, ...)

National Electricity Utility (ONE: *Office National de l'Electricité*) is the prime operator in Morocco's electricity supply sector. ONE investigated the possibility of introducing Nuclear Energy as a mean of achieving its strategic orientation.

Presently there is a plan to strengthen the nuclear authority by combining the Safety Authority (ASN) and the National Centre of Radiation Protection (CNRP) in one independent Nuclear Safety Authority (NSA) based on the IAEA recommendations. The new nuclear law is under signature by the Moroccan authorities

The use of nuclear technology in medicine, agriculture and industry is very advanced in Morocco. This technological progress has been accompanied by fairly detailed legislation and significant involvement on the part of Morocco in international conventions and agreements.

As part of the effort made by Morocco to consolidate and strengthen its legal infrastructures, basic legislation has been drafted with assistance of IAEA experts and in conformity with Morocco's international undertakings. The examination and finalisation of these texts is being carried out by the Nuclear Regulation Commission.

In this animated context, the NGOs has an important role to make sensitive the various national operators in the field of the nuclear power as regards the protection of ionizing radiations and the installation of the culture of the radioprotection and the nuclear safety and nuclear security in the national educational system.

4. Principal National societies in the field of ionizing radiation in Morocco.

AMR: The establishment of Moroccan Radiation Protection Association since 2002 aims essentially to encourage activities and information exchange in the field of radiation protection and related areas, assist in informing both the public and the professionals concerned about the problems and requirements related to radiation protection for the protection of man and the environment and promote professional training in radiation protection.

AIGAM: Association of Moroccan Nuclear Engineers, created in 1985 and is very active in morocco, at both scientific and legal levels. It plays a leading role in nuclear development in Morocco, in co-operation with the French CEA and the international Nuclear Law Association (INLA) and other international bodies

AMPM: The Moroccan Association of Medical Physics (AMPM) was created on 1996 and became IOMP member on 1997. One of the aims of AMPM, as listed in its constitution, is to promote and to organize Education and Training of Medical Physics in the country. AMPM is very active in the CPE by organizing biannual national meetings and periodic lectures on various topics on the use of radiation in medicine: radiodiagnostic, nuclear medicine and radiotherapy.

GMTR: is an association of Moroccan physicists working in the field of nuclear reactors (in Moroccan universities, in CNESTEN and abroad). Its main objective is to coordinate research being conducted by different teams and the organization of scientific and technical meetings in the field of nuclear reactor physics.

5. Example of associative work : Activities of AMR

AMR is very active association by organizing national and international meeting and periodic lectures on various topics on the use of ionizing radiation in different fields and at different levels. It addressed to large public and to relevant national stakeholders in the domain of utilization of ionizing radiation. AMR has organized or co-organized since its creation in 2002, the following conferences, meetings and debates:

- 07 December 2002 in Rabat, A Conference on Epidemiological Studies consequences in the big nuclear accidents
- 02 July 2003 in Casablanca, a Conference on the radioprotection in the industry: inventory of fixtures and Perspectives,
- December 27th, 2004 in Rabat, a Scientific Meeting on the radioprotection in the medical sector: states of places and perspectives,
- April 25th, 2005 in Faculty of Science of Kénitra, the Moroccan Association of the radioprotection and the Laboratory of the low radioactivities and the environment organized, within the framework of the international year of the physics, a national meeting on " The state of the research in the field of the radioprotection in Morocco ". This meeting had in particular for objective to bend over the inventory of fixtures, the current research works in universities and implied national institutions, orientations and perspectives. The proceedings of this meeting were published in 2006.
- On February 15th, 2007 in Mohammedia, AMR organized in collaboration with The SAMIR(The Moroccan limited company of the Refining Industry), a day of information and of sensitization on the radioprotection, under the theme " The capacities radio metrics: uses and measures of radiological safety ". This day gathered the specialists in radioprotection with the professionals of the Industrial sector, to inform them and make sensitive them on the standards and the current national regulations in the field of the radioprotection, and to discuss with

them of the main met difficulties, Seen to bring appropriate solutions. Representing of more than 28 private societies and public bodies were present.

- On July 07th, 2007, a Conference intended for the public of the Kenitra city situated near the Center of Maamora on The management of the radioactive wastes. They attended this conference, the local elected representatives and the members of parliament.
- On May 9th, 2007 in Rabat, The Association of the Engineers in Atomic engineering of Morocco (AIGAM), in partnership with the Moroccan Association of Radioprotection (AMR), the Moroccan Grouping of the Technology of Reactors (GMTR) and the Moroccan Association of the Medical Physics (AMPM), organized, for the Moroccan media, a day of information about nuclear applications in Morocco. This day knew a big success with the cooperation of the professionals in the field of the print media, of the radio and of the television.
- On May 13th, 2008 in Rabat, The AMR organized in association with the international Association of nuclear Law (French section) a workshop on "standards of safety in the nuclear law". This meeting aimed to inform the professionals and the public about the standards of radiological and nuclear safety, their evolution and their impact. The participants in this meeting acquainted with experiences of application of the nuclear law through the French and Moroccan cases to discuss concepts of the culture of the safety which constitute an essential to construct a safety system on the subject for the development of the nuclear technology.
- On April 24, 2007, Participation to the committee of organization of the Second All African IRPA Regional Radiation Protection Congress hold in Ismailia, Egypt But because of financing lack, person of AMR was able to attend the works of this congress.
- On December 22, 2009, The AMR organized in association with the Team of Nuclear Physics and Techniques of the Faculty of Science of Kénitra, the CNESTEN, the Research Unity of Biophysics (Faculty of Medicine of Sousse, Tunisia) and the Department of applied Physics II (University of Seville: Spain) an international meeting on "The radioactivity in natural waters: radiological implications". The purpose was to review the state of scientific research progress in the field of the improvement of the nuclear analysis methods so as to adapt them to the various measures of the present radio-elements in natural waters. What allowed establishing a map of concentrations of the main polluting metallic and radioactive elements accumulated in natural waters, to constitute a database and to study the impact of the low levels of the natural radioactivity on the health of the consumer.
- On February 22, 2010 Participation in the Seminary about Electronuclear and the Management of the Radioactive Waste which took place on in Rabat. During this seminary organized by the CNESTEN under the aegis of the ministry of the Energy and Mines. After this day, the AMR

also participated to the workshop organized by the Ministry of Energy and Mines on the Management of the radioactive waste from 23 till 25 February with the cooperation of the experts of the IAEA from France and Belgium. This workshop worked to elaborate a project of a road map for the management of the radioactive waste with short, average and long term.

- On April 9th and 10th, 2010 in Rabat, a Workshop on the Radioprotection in interventional radiology organized in collaboration with Moroccan association of interventional radiology and European commission.
- On March 22 to 26, 2010 Participation to the organization of the International Congress NORM 6 which took place in Marrakech on "Naturally occurring Radioactive Material "
- On September 13-17, 2010 Participation to the organization of Third African IRPA Regional Congress at Nairobi in Kenya.

This list of activities shows that the AMR organizes regularly annual manifestations and expects to organize more international meetings such as the congresses of IRPA Africa to facilitate more exchange of experiences and information in the field of the radioprotection.

6. **Conclusion** :

As everyone recognizes, nuclear power is increasingly used by all the world and especially in vital sectors such as health, agriculture, industry, research, etc. ... this use requires a culture in the field of radiation protection from ionizing radiation. This culture must be based on reliable knowledge. Promoting culture radiation protection must be provided by national and international associations who must work in broad collaboration with operators in the field of uses of ionizing radiation at all levels in all areas such as Medicine, Research, Industry , Press and politics.

The associative work in the field of radiation protection, which aims to consolidate the culture of radiation protection. Associative work in the field of radiation protection, which aims to consolidate the culture of radiation protection, is essentially as has been established by the IRPA:

- To give visibility to the fundamentals of RP (science and values)
- To promote radiation risk awareness
- To promote shared responsibility among practitioners, operators, regulators and management
- To maintain the RP heritage
- To facilitate its transmission
- To improve the quality and effectiveness of RP
- To contribute to the general safety
- To improve communication with society

- To enhance the visibility of RP in our societies

In Morocco, a set of meetings, conferences, courses, seminars and publications by AMR along of 10 years since its creation, has enabled the association to be known by the general public, authorities, politicians, academics, doctors, engineers, nurses and the media. This promoted dialogue, sharing experience among RP experts, other disciplines experts, authorities, decision- makers, stakeholders and the general public. It turned out after all of these activities and meetings, that the culture of radiation protection is required to accept nuclear power, to convince operators and public that the association's role is to teach them to protect themselves and this is not a state institution or emanating from the nuclear center, or she works on their own. Much remains to be done by the association taking into consideration the challenges faced by the IRPA.

- What are the elements of the RP culture and how could we define it?
- Is it possible to assess the RP culture and what could be the criteria?
- How to engage the stakeholders (regulators, operators, professional organizations...) in the process of developing RP culture.
- What is the role of IRPA and its associate societies in promoting an RP culture?
- What are the criteria for success?

References:

1. IRPA documents (<http://www.irpa.net/>)
2. AMR documents (<http://www.cnesten.org.ma/amr/>)