

**Radiation protection services for the IAEA**

A central responsibility of the IAEA's radiation protection services section is to ensure that, during operations at Agency premises, the health and safety of workers, as well as of individuals of the public, are maintained. IAEA radiation protection rules and procedures or other pertinent safety documentation supports the achievement of this task.

On a regular basis, personnel monitoring is provided to about 400 IAEA staff members and about 60 recruited technical co-operation experts who assist with the implementation of various projects in developing countries.

To monitor external irradiation, the thermoluminescent technique (TLD) is used for X-rays, gamma rays, and neutrons. Annually, 35 000 TLDs are evaluated, which describe the extent of this activity. Possible internal contamination is measured by whole-body counting and urine sample analysis (for plutonium, gamma content). Approximately 1000 whole-body countings and 1000 plutonium and gamma urine analyses are performed annually.

Temporary dosimetry services are also provided to some Member States where these services are not yet available. The Section also evaluates certain monitors which were developed by the IAEA for safeguards purposes.

Other internal activities include establishment of monitoring programmes and providing advice on radiation safety matters (radiation protection equipment, decontamination, waste management, evaluation of safety analysis reports) to other Agency divisions.

**RAPAT missions, 1984-89**

*Performed:*

- |                                    |                    |
|------------------------------------|--------------------|
| Bangladesh (1988)                  | Madagascar (1988)  |
| Chile (1985)                       | Malaysia (1985)    |
| China, People's Republic of (1984) | Mexico (1987)      |
| Colombia (1987)                    | Nicaragua (1985)   |
| Costa Rica (1988)                  | Nigeria (1988)     |
| Côte d'Ivoire (1988)               | Panama (1986)      |
| Dominican Republic (1986)          | Peru (1987)        |
| Ecuador (1986)                     | Philippines (1987) |
| Egypt (1986)                       | Portugal (1986)    |
| Ethiopia (1988)                    | Senegal (1988)     |
| Greece (1988)                      | Syria (1987)       |
| Guatemala (1988)                   | Sudan (1987)       |
| Iceland (1986)                     | Tanzania (1987)    |
| Indonesia (1988)                   | Thailand (1989)    |
| Iraq (1984)                        | Turkey (1987)      |
| Jamaica (1988)                     | Venezuela (1986)   |
| Jordan (1988)                      | Viet Nam (1988)    |
| Kenya (1986)                       | Zaire (1986)       |
| Korea, Republic of (1987)          | Zambia (1986)      |

*Planned for 1989:*

- |                             |          |
|-----------------------------|----------|
| Bolivia                     | Mongolia |
| Cameroon                    | Morocco  |
| Cuba                        | Paraguay |
| Ghana                       | Romania  |
| Iran, Islamic Republic of   | Zimbabwe |
| Korea, People's Republic of |          |



**Radiation protection in Africa**

by **Abdel Abu Bakr**

IAEA Member States in Africa have established nuclear energy facilities for research and for applications in fields such as agriculture, medicine, and water resources assessment. In various forms, nuclear energy is being applied today in many African countries on a scale which is probably greater than usually realized. Looking some years ahead, more and more economic development will be undertaken utilizing nuclear energy, particularly when the necessary scientific infrastructure has been established and trained scientists become available. However, the use of ioniz-

ing radiation has not been accompanied by a corresponding effort to ensure radiation protection of the staff involved and of the population at large.

Until recently, the subject was given scant consideration, presumably on the premise that atomic energy applications were so modest using low-energy sources and presented such a low hazard that it would be needless to exercise extensive control by a regulatory process. As far as the IAEA was concerned, nuclear energy applications, however modest, should occur within an adequate framework of radiation protection and any activity making use of Agency technical assistance should meet its safety standards. —————>

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Today, the establishment of an appropriate radiation protection infrastructure is regarded by all African countries as an important obligation and a governmental responsibility to the health and safety of the citizen. Governments are newly worried about emission of radioactive materials in the environment and the contamination of food. The radiation protection problem is now tackled by African governments with sufficient conviction but definite steps remain to be taken. Many factors have reinforced the commitment to the quality and effectiveness of radiation protection measures. These include the occurrence of some radiation accidents, the increasing global concern for the environment, the possible contamination of food, and the dumping of hazardous waste. Yet, apart from the economic development process itself, the most important factors have been the increasing use of ionizing radiation and the increasing awareness of its positive potential, as well as the risks.

#### **Urgent priority**

African governments consider radiation protection an urgent priority and the IAEA has significantly expanded the assistance and service it provides to African countries in drafting proper regulations and creating adequate machinery to supervise and ensure their application. Seventeen African countries are currently receiving Agency assistance under national projects in radiation protection, and in the past 5 years about 15% of all disbursements financing assistance to African countries went into radiation protection assistance.

The assistance under national projects spans the range of radiation protection infrastructure requirements in view of the needs of African countries. It normally covers the formulation of laws, supplementary regulations, guides, and codes of practice; and the provision of equipment for radiation monitoring, calibration, dosimeter processing, environmental sampling, and other uses.

As a whole, countries are also benefitting from the interregional project which provides missions by the IAEA's Radiation Protection Advisory Teams (RAPATs). So far, eleven African countries have received RAPAT missions (Côte d'Ivoire, Egypt, Ethiopia, Kenya, Madagascar, Nigeria, Senegal, Sudan, Tanzania, Zaire, and Zambia), and four missions will be undertaken this year to Morocco, Ghana, Cameroon, and Zimbabwe. The missions have been extremely useful in assessing for the first time the state of radiation protection in the visited country and in advising authorities on equipment and staff requirements,

training needs, and other elements of a sound radiation protection programme.

In the area of manpower development for radiation protection, the IAEA aims to ensure the existence in each country of well-qualified staff that are capable of developing and implementing an effective regulatory programme to deal with present needs in radiation protection related to all uses of radiation in the country. To be effective, the assistance requires a corresponding commitment from the governments concerned. Current constraints seem to be the legislative approval process and the lack of resources, human and material.

#### **Regional project established**

A recent initiative by the IAEA has been the establishment of a regional project for African countries. Started in 1988, it has a 3-year term and provisions for a regional expert, equipment, fellowships, and group training. The project encompasses pre-project missions, advisory missions, local or regional training courses, and workshops. It further provides for "back-stopping" of national projects with expert service and standardized equipment. Temporary personnel monitoring services from the Agency are available to Member States which either do not have a service locally or need temporary assistance because of equipment failure in an established national service.

The regional project ensures that implementation of national projects can be properly planned and regularly evaluated. Advice and techniques can be standardized, intercomparison studies can be made, and counterparts can be brought together at seminars for exchanges of information and experience.

#### **Activities and results**

Activities in 1988 covered various elements of radiation protection:

- An advisory mission to Zimbabwe in January 1988 was able to assist the Government in the assessment of radiation protection aspects of the operation of a newly installed 6 mega-electron volt linear accelerator which was going to be commissioned.
- A pre-project mission to Cameroon was able to assist the Government in reviewing a project request for Agency assistance on radiation protection. Since neither the national infrastructure nor manpower is available for setting up a radiation protection service, it was suggested that assistance

under the IAEA's interregional project should be given in 1989 for training competent national staff.

- A regional training course for radiation protection officers was held from 8 August to 2 September 1988 in Nairobi, Kenya. Fourteen participants from Kenya, Uganda, Tanzania, and Zimbabwe were trained in basic nuclear physics and radiation protection, radiobiology and biological effects of radiation, international regulations, legislation, personnel monitoring, food contamination monitoring, and quality control of X-ray equipment. The course was much appreciated by the participants and regarded as highly useful.

- A seminar on radiation protection services for developing countries in Africa was arranged in Nairobi from 5-9 September 1988. Forty participants from 14 African countries participated. Featured were six sessions covering radiation protection legislation, radiation accidents and emergency preparedness, environmental monitoring, radioactive waste management, radiation protection in medical applications of ionizing radiation, and radiation protection services in Africa. At the closing session, there was a clear consensus that due to the rapidly growing interest for radiation protection development in that region, similar seminars should be organized at regular intervals, at least once every 2 years.

- Temporary dosimetry services were provided to technical co-operation projects in Nigeria and Sierra Leone.

- Calibration service was provided to Kenya, Tunisia, and Zimbabwe.

- Expendable items that are not locally available but mandatory for the operation of established personnel monitoring systems were provided to Ethiopia, Ghana, Madagascar, Mali, Uganda, Tanzania, and Zambia. The items included thermoluminescent dosimeter (TLD) badges, plastic bags, and light-tight dosimeter labels.

#### Future activities

Planned activities include:

- Pre-project missions for Senegal, Mauritius, and Sierra Leone. These would assess the radiation protection conditions in these countries, which have no established radiation protection infrastructure. Ionizing radiation is used in various scientific and technical fields.

- Follow-up missions to Mali, Uganda, and Zambia. These countries are facing serious technical and economical problems and may need special support from the IAEA's interregional project, in addition to national projects.

- A meeting in Nairobi (May or June 1989) to discuss regional co-operation in radiation protection for the East African region.

- A workshop on basic radiation protection and on the development of a national infrastructure for radiation protection for Uganda and Zimbabwe (November 1989) and for Madagascar, Mali, and Senegal (December 1989).

- A regional training course for radiation protection officers from French-speaking countries for May/June 1990.

- A seminar (in 1990) on radiation protection services for developing countries in Africa.

RAPAT missions in Africa

