

MANAGING NUCLEAR INFORMATION IN TANZANIA

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Abstract. Nuclear information management and the applications of nuclear technology in Tanzania are limited to medical, agriculture, research and some industrial applications. It is demanding that the National database for nuclear information be established to keep the track of the information on radiation facilities, manpower development, radiation sources and radioactive waste management. In this paper the current status of nuclear information management in Tanzania is presented. The development, setbacks and future plans for establishment of national database with consequent improvement of nuclear information management are discussed. The National Radiation Commission (NRC) which is an official government body responsible for atomic energy matters in collaboration with other institutions applying nuclear technology keeps the records and inventory of facilities, manpower development and projects related to the nuclear field. The available information about nuclear application activities has been obtained through possessors' declaration, monitoring at entry/exit points, periodic reports from the licensees, radiation safety inspections, and the available link with the International Atomic Energy Agency (IAEA). In order to facilitate the dissemination of information, five ICT centres to serve in the fields of research, nuclear instrumentation, human health and agriculture have been established. The inventory of radiation facilities/materials and human resource is being build up as an initial input to the National database. Establishment of INIS centre is expected to improve the nuclear information management system in the country. The government and the IAEA are encouraged to support nuclear information management especially by strengthening ICT centres and facilitating the establishment of INIS National centre.

1. Introduction

The United Republic of Tanzania (URT) is the IAEA member state and has INIS membership since 2003. Nuclear Knowledge Management as well as the application of the nuclear technology in URT is limited to medical, agriculture, research, and industrial applications [2]. With the increasing importation and uses of radiation sources, the NRC was established to regulate, maintain the database, promote and ensure safety in all aspects of ionizing radiation within the country. Within the present legal framework, the NRC has the sole responsibility of registering, performing radiation safety inspections, licensing users, keeping the inventory and managing radioactive waste(s) in the country [1]. The NRC is improving its nuclear information management system by establishing ICT centres, national INIS centre and strengthening cooperation between stakeholders.

2. Present status of information acquisition and dissemination.

At present Tanzania has not yet established a national database for nuclear science and technology information. However, the NRC has been collecting and keeping the available information that has made the national inventory of practices, sources and manpower to exist. At present there are about 1,200 radiation workers, 250 licensed users of nuclear technology and approximately 8.0kCi of radioactive waste in terms of spent sealed sources of various nuclides. There are also approximately 23.0kCi of radioactive materials in use by various institutions in the country. Methods used in building up the inventory are detailed below:

2.1. Declaration

The Protection from Radiation Act, 1983, emphasizes that the importer(s) is/are required to apply for the importation license by filling the application forms from the NRC indicating clearly the use of the material(s) and the actions to be taken when the material(s) become waste. When the radiation source is in the country a license authorizing possession and use is issued after confirming that the licensee has fulfilled the license requirements [6]. The record of the material, licensee and the available manpower forms part of the National inventory.

2.2. Monitoring at entry/exit points

There exist regulations requiring the customs officers at all entry/exit points to demand the license to import, export or transfer the nuclear material for use or disposal [1, 6]. In case a person not aware of the regulations or attempt to practice illicit trafficking of any nuclear material, the clearance will not be done until the regulatory authority is informed. In this way the inventory information is updated. However, there have been cases whereby the radioactive materials were imported and or possessed without the knowledge of custom officers or the regulatory authority. Such cases constitute one of the challenges that face the NRC. To date the NRC has recorded ten incidences of illegal possession, stolen and abandoned radioactive sources [2]

2.3. Periodic reports from the licensees and follow-up inspections

Whenever required, a licensee produces a report stating clearly the status of the source whether still being used, stolen or if there is an intension to transfer or lease to other user(s). Depending on the declaration made during importation, the radioactive material if no longer useful can either be returned to the supplier or collected and managed at Central Radioactive Waste Management Facility [1]. In case the material is missing, the laid down procedures is to report to police, regulatory authority, all entry/exit points and disseminate information to the public through reliable means. As a requirement, the principle parties shall permit duly authorized representatives of the regulatory authority to inspect their protection and safety records and to carry out appropriate inspections of their authorized activities [3]. In Tanzania the NRC perform such inspections and the findings normally form the basis for re-licensing or withdrawal of existing authorization [1].

2.4. A link with the International Atomic Agency

Most of the research projects utilizing nuclear techniques are supported through the Agency technical cooperation projects. Once the project is approved the regulatory authority is informed of the nuclear materials or devices to be used and is registered to the National inventory once received by the counterpart. There are more than ten institutions participating in this kind of projects countrywide as shown in table 1.

Table 1. Institutions participating in the IAEA TC Projects

<i>Institution</i>	<i>Application(s)</i>
ORCI ^a	Brach therapy, Tele therapy, Nuclear medicine
TTRI ^b	Tsetse fly irradiation
TIRDO ^c	Non Destructive Testing (NDT)
SUA ^d	Research and Teaching
NAIC ^e	Artificial Insemination
NRC	Calibration
SARI ^f	Plant breeding
UDSM ^g	Research and Teaching
MNH ^h	Brach therapy, Tele therapy, Nuclear medicine
MUCHS ⁱ	Research and Teaching
ADRI ^j	Research
MLINGANO	Research and Teaching
IFAKARA	Research
MEM ^k	Mineral exploration***
MOW&LD ^l	Artificial Insemination

^a Ocean Road Cancer Institute

^b Tsetse and Trypanosomiasis Research Institute

^c Tanzania Industrial Research and Development Organization

^d Sokoine University of Agriculture

^e National Artificial Insemination Centre

^f Selian Agricultural Research Institute

^g University of Dar Es Salaam

^h Muhimbili National Hospital

ⁱ Muhimbili College of Medical Sciences

^j Animal Disease Research Institute

^k Ministry of Energy and Minerals

^l Ministry of Water and livestock development

2.5. Scientific information and Documentation section establishment

The NRC has a section responsible for documenting all scientific information related to nuclear technology. Documented information includes all published and non-published papers (nuclear and non-nuclear), scientific journals and technical documents from the IAEA. The NRC normally shares the information available with the practicing professionals through consultation and training events.

2.6. Information and Communication Technology (ICT) centres

The introduction of ICT centres in the country has been very crucial in information dissemination and training. Manpower training and information dissemination has been going on in the four ICT centres already established in the country. Among others, the objective of setting up these centres is to establish a sustainable national capacity for using potential communication technologies for training and education in the field of nuclear science and technology.

The areas targeted are: - human health, animal diseases, Artificial Insemination (AI), pest control and nuclear instrumentation. The ICT based learning/training is expected to: -

- Upgrade the knowledge of nuclear medicine physicians on current development and achievement in the field and, where possible, enable them to receive on-line advice from colleagues within and outside nuclear medicine community on specific medical issues
- Upgrade the knowledge of medical physicians allied with nuclear medicine specialists on aspects of clinical nuclear medicine related to diagnosis
- Train and upgrade the knowledge of nuclear medicine technicians and technologists
- Conduct rinder pest surveillance and vaccination campaign
- Train sufficient AI technicians to ensure the availability of these services in rural areas
- Train personnel involved in troubleshooting and repair of nuclear instruments

3. Setbacks in Establishment of Nuclear Management System

There have been some constraints in the whole process of managing nuclear information in the country. Financial constraint has been one of setbacks in collecting and disseminating nuclear information in the country. The national survey on all places utilizing nuclear technology for the purpose of gathering information on activities involving nuclear technology has not been completed due to lack of funds. This exercise was expected to contribute on building up a reliable nuclear information database. It has been revealed that some public members were not aware of Protection from Radiation Act (1983) and regulation governing application of nuclear technology. This has been due to lack of funds to the regulatory authority to publicize itself as well as importance of information transfer and dissemination pertaining to nuclear applications. Another constrains is the reluctance of member of public to disclose information on nuclear applications due to ignorance, lack of awareness and the weakness of the law itself and regulations regarding nuclear technology and facilities. This led to some violations and hence illegal procession and use of radiation sources. Some of imports/exports of nuclear materials in the country were done without been registered to the national inventory. A low fine and short imprisonment term is one of the weaknesses of the Protection from Radiation Act (1983) to mention a few. It was stated in the Act that a person who transport, possess or use nuclear materials without an authorization is liable to a fine of 10,000 Tanzanian shillings (~ USD 8) or imprisonment of a term less than six months[1, 6]. This fine was so little that it did not discourage illegal possession, transport or use of nuclear materials. However, the new Atomic Energy Act, 2003 has been taken care of whereby fine has been raised to 3,000,000 Tanzanian shillings (~3,000USD) and imprisonment term of not less than three years or both. Shortage of working facilities and expertise on data management system for information management is also experienced.

4. Discussion

To have a well-established system for nuclear information management, the establishment of the national database on this issue is vital. This is achieved by first, to establish an inventory of the existing information about personnel and nuclear materials. Secondly, to establish the national database that will keep the records of information documentation, storage and dissemination. The presence of regulatory authority, enabling legislations together with good cooperation between stake holders have made the nuclear materials and related information management possible. More improvement in the coordination and provision of information

services in nuclear science and technology is expected after the National INIS centre and NRPA have been established and the ICT centres strengthened.

4.1. Establishment of the International Nuclear Information System (INIS) centre in Tanzania
 Due to the fact that the documentation of currently available information is not properly done and that there is high increase in number of users of nuclear technology in the country, the regulatory authority has seen the need to establish the INIS centre, which will enable the users of nuclear technology to gather information on the safe application of the nuclear technology. The establishment of the INIS centre through the Agency Technical Cooperation Program will enable the country to get information on the peaceful application of nuclear technology, which will be a catalyst on the promotion of nuclear technologies in the country. The centre is expected to carry out trainings on the safe use of nuclear technology and use of INIS services, coordinate and perform collaborative duties with the institutions applying nuclear technologies, offer consultation and promote awareness and capability for nuclear safety and information handling and exchange in the country. Since Tanzania has a number of institutions involved in the peaceful application of nuclear science and technology, the centre is expected to build the capability of the staff of those institutions in information management and consequently assist in the transfer of knowledge. The centre is also expected to be a source of information on the nuclear technology for scientists, university students, researchers, medical professionals and other users of the technology.

4.2. Establishment of National Radiation Protection Association (NRPA)

The NRPA to be established will have vital roles to play in terms of information acquisition, storage and dissemination. It is envisaged that the association will bring professionals together in order to share, exploit and improve their varying technical expertise in nuclear technologies, radiation protection and security of radiation sources. Being a professional association, it will play a neutral role between the regulatory authority and nuclear stakeholders (research establishments, Universities, hospitals, industries and mining sector) (NRPA constitution draft, 2004). Basic rights of employees that employers might ignore will be dealt with by the association thus ensuring manpower and knowledge retention within the nuclear fields. This association complements the contributions from already established professional associations like Tanzania Radiographers' associations and Medical Doctors' association of Tanzania.

5. Conclusion and recommendations

Although URT is not a nuclear country, it is still necessary to have a nuclear information database of the available nuclear applications for the purpose of regulating the importation of nuclear materials and to ensure safe use and disposal. With regards to funding, training and provision of equipment, it is recommended that both the government and the Agency continue to support the institutions that are involved or facilitate the management of nuclear information in the country. Publicity of the nuclear regulations should also be increased for easy collection and dissemination of information. It is further recommended to establish more ICT centres and make more scientific literatures available in institutions promoting nuclear science and technology.

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