RADIOACTIVE WASTE MANAGEMNT FOR THE PROTECTION OF HUMAN HEALTH AND ENVIRONMENT REGULATIONS, 1999

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THE PROTECTION FROM RADIATION ACT, 1983
(Act No. 5 of 1983)

Made under Section 40(1)

RADIOACTIVE WASTE MANAGEMNT FOR THE PROTECTION OF HUMAN HEALTH AND ENVIRONMENT REGULATIONS, 1999

WHEREAS sub-section (1) of section 40 of the protection from Radiation Act, No. 5 of 1983, empowers the Minister on his own mo-tion or upon recommendation or advice by the Commission to make regulations to ensure safety against all radioactive materials and radiation devices which are potentially hazardous for the purpose of this Act.

AND WHEREAS these Regulations are intended to set up the basic technical and organizational requirements to be complied with by waste generators and operators of waste management facilities in order to ensure the protection of human health and the environment from the hazards associated with radioactive waste within and beyond national borders, present and future;

AND WHEREAS the Commission after preparing the Radioactive Waste Management for Protection of Human Health and Environment Regulations for all persons whose undertakings involve production, treatment, conditioning, storage, transportation and disposal of radioactive waste, and covering requirements associated with such steps in Waste Management as collection, segregation, characterization and preparation for transport of radioactive waste arising from medical, industrial (but not mining and milling activities) and research facilities where radioactive materials and sources of ionizing radiation are produced, used or handled, has recommended to, and advised the Minister;

NOW THEREFORE, in exercise of these powers, the following Regulations are made.

PART I
PRELIMINARY

Short title and commencement

1. These Regulations may be cited as the Radioactive Waste Management for the protection of Human Health and Environment Regulations, 1999.

Interpretations

2. In these Regulations, unless the context requires otherwise;
'annual Limit on intake (ALI)' means the intake of given Radionuclide in a year by reference man which would result in a committed dose equal to the relevant dose limit. The ALI is expressed in units of activity. (According to ICRP 60 an effective dose of 20 mSv shall not be exceeded for occupational workers and of 1mSv for the Public);
"characterization" means the determination of the physical, chemical and radiological properties of the waste to establish the need for further adjustment, treatment, conditioning, or its suitability for further handling, processing, storage or disposal;
"Clearance levels" means a set of values, established by the Regulatory Body and expressed in terms of activity concentrations and/or total activities, at or below which sources of radiation can be released from regulatory control;
"conditioning" means those operations that produce a waste package suitable for handling, transportation, storage and/or disposal;
"Container" means the vessel into which the waste form is placed for handling transportation, storage and/or eventual disposal. The waste container is a component of the waste package;
"disposal" means the emplacement of waste in an approved, specified facility (e.g. Near surface or geological repository) without the intention of retrieval. Disposal may also include the approved direct discharge of effluent into the environment with subsequent dispersion;
"exempt waste". In the context of radioactive waste management, waste (from a nuclear facility) that is released from nuclear regulatory control in accordance with clearance levels because the associated radiological hazards are negligible. The designation shall be in terms of activity concentration and/or total activity and may from, mass or value of waste, and its potential use;
"licences" means the holder of a current licence granted for a practice or source who has recognized rights and duties for the practice or source, particularly in relation to protection and safety;
"minister" means the minister for time being responsible for matters relating to radiation protection;

"minister" means the minister for time being responsible for matters relation to radiation protection;
"monitoring" means the measurement of radiation or radionuclides for reasons related to the assessment or control of exposure and the interpretation of such measurements. Monitoring can be continuous and non-continuous;
"nuclear facility" means a facility and its associated land, building and equipment in which radioactive materials are produced, processed, used, handled, stored, or disposed of on such a scale that consideration of safety is required;
"quality assurance" means all those planned and systematic actions necessary to provide adequate confidence that an item, process or service will satisfy given requirements for quality, for example, those specified in the license.
"radioactive materials" means a person with appropriate independence and authority appointed by the site management as responsible for radiation safety coordinating purchases, stocking of radioactive materials and the disposal of the waste;
"radioactive waste" means material that contains or is contaminated with radionucleds at concentrations or activities greater than clearance levels as established by the regulatory body, and no use is foreseen;
"radionuclide" means a nucleus (of an atom) that possesses properties of spontaneous disintegration (radioactivity). Nuclei are distinguished by their mass and atomic number.
"regulatory body" means the national Radiation Commission as established by the Act;
"Repository" means a nuclear facility where waste is emplaced for disposal. Future retrieval of waste from the repository is not intended;
"segregation" means an activity where waste or materials (radioactive and exempt) are separated or are kept separated or are kept separate according to radiological, chemical and/or physical properties which will facilitate waste handling and/or processing. It may be possible to segregate radioactive from exempt material and thus reduce the waste volume;
"waste generator" means any person or persons or organization engaged in activities which generate radioactive waste:

"Waste management" means all the activities, administrative and operational, that are involved in the handling, treatment, condition, storage and disposal of waste and it includes transportation;
"Waste package" means the product of conditioning that includes the waste form and any container(s) and internal barriers (e.g. absorbing materials and line), as prepared in accordance with requirements for handling, transportation, storage and/or disposal;
"waste form" means the waste in its physical and chemical form after treatment and/or conditioning resulting in a solid product prior to packaging, the waste form is component of the waste package.

3. (1) In addition to any existing ionizing radiation and nuclear Regulations in force the commencement of these regulations, these Regulations shall apply to:- Applicat ions

(a) All solid, liquid and gaseous waste with activity levels above the clearance levels specified in the Second Schedule in table II-IB;

(b) All users of sources of ionizing radiation in medicine, industry, teaching, research agriculture, hydrology, geology and other fields of human activity whenever such uses are subject to licensing under these Regulations;

(c) Operators of radioactive waste management facilities other than the Regulatory Body.

(2) These Regulations shall apply throughout Tanzania mainland.

Radioactive waste classification

4. Radioactive waste shall be classified by the following categories:-

(a) According to its physical form and composition:-

i) Combustible waste;
ii) Non-combustible waste;
iii) Compactable waste;
iv) Non-compactable waste
v) Liquid aqueous waste
vi) Liquid organic waste;
vii) Gaseous waste;
viii) Sealed radiation sources;
ix) Biological waste (like animal carcasses which might undergo decomposition if not properly treated and stored);
x) Medical waste (e.g. syringes, bed linen and contaminated clothing from a hospital environment);

(b) According to the activity concentration and half life's of radionucles contained in the radioactive waste:-

(i) Low level radioactive waste (e.g. the activity is less than 10MBq), containing short lives radionuclides only (e.g. with half-life less than 50 days) that will decay to clearance levels within one year after the time of its generation. Disposal is by discharge after reaching clearance levels;

(ii) Low and intermediate level radioactive waste, containing the radionuclides with half life less than or equal to thirty years and restricted long lived radionuclide concentrations and that is not expected to decay to clearance levels within one year from the time of its generation (limitation of longer lived apha emitting radionuclides to 4000 Bq/g in individual waste packages and to an overall of 400 Bq/g per waste package). This waste needs to be disposed of at a near surface or geological disposal facility;

(iii) Low and intermediate level radioactive waste, containing the radionuclides with half life greater than 30 years, and concentration of alpha emitters exceeding the limitations under paragraph (ii) above. This waste needs to be disposed of in deep geological facilities only.

(iv) High level radioactive waste, with thermal power above 2kW/m^3 and concentration of alpha emitters exceeding the limitations for paragraph (ii) above (e.g. spend fuel from research reactors). This waste needs to be disposed of in deep a geological facility only.

PART II
RESPONSIBILITIES, DUTIES AND ADMINISTRATIVE MEASURES

Responsibilities of a Regulatory Body

5. (1) The Regulatory Body shall have the power and responsibility for enforcement of compliance of the provisions of these Regulations and any other relevant requirements by waste generators and the implementation of the licensing process for generation and management of radioactive waste.

(2) The Regulatory Body shall take the responsibility for management of radioactive waste where the waste generator is incapable of appropriate management of the radioactive waste or the license is revoked, or the waste generator no longer exists. The Regulatory Body may require to recover the costs incurred from those responsible.

(3) Notwithstanding the provisions of subparagraphs (2) and (4) of regulation 5 of these Regulations, the Regulatory body shall have general powers and shall exercise control in all matters regarding safe management of radioactive waste including issuance of licenses connected thereto, suspending or revoking the said licenses and or closing down an undertaking established for that purpose if satisfied that the safety of the user or operator or the public is endangered or threatened to be in danger.

(4) The Regulatory Body shall establish and operate a Central Radioactive Waste Management Facility acronymic ally called CRWMF.

(5) Without affecting the powers of the Regulatory Body conferred by these Regulations, the Chief Executive officer of the Regulatory Body shall if he deems necessary for the better running, operation and carrying out of the day to day duties of the Central Radioactive Waste Management Facility, appoint such number of staff to work at the of the Regulatory Body shall if he deems necessary for the better running, operation and carrying out of the day to day duties of the Central Radioactive Waste Management Facility, appoint such number of staff to work at the facility, and such number of staff if appointed shall be referred to as the authority of the Central Radioactive Waste Management Facility for the purposes of these Regulations. For avoidance of doubts, the Chief Executive Officer of the Regulatory Body shall be the Registrar of the National Radiation Commission.

(6) The authority of the Central Radioactive Waste Management Facility shall discharge its duties under the instructions given to it by the Regulatory Body.

Function of the Central Radioactive Material facility

6-(1) The Central Radioactive Waste Management Facility shall be the centre for collection and transportation of all radioactive waste from the waste generator's establishments and for treating, conditioning and storing the radioactive waste requiring more than one year decay period to bring down the activity level to below clearance levels to below clearance levels.

(2) The Central Radioactive Waste management Facility shall be responsible for the discharge of exempt waste and to store unconditioned and conditioned radioactive waste until a system for disposal is made available.

Responsibilities of the waste generator

7(1) The primary responsibility for the safe management of radioactive wastes imposed to the waste generator who shall take necessary actions to ensure the safety of radioactive waste unless the responsibility has been transferred to another person or organization as approved by the Regulatory Body.

(2) The licensee shall make available an interim store for his accumulated radio waste. In the absence of a Central Radioactive Waste Management Facility, or in case the Regulatory Body is unable to provide the said facility for such service that sore shall serve as his on site interim storage facility.

(3) The waste generator shall have or secure instruments or equipment capable of measuring relevant limits applicable to the waste generated.

(4) The waste generator shall ensure that any released radioactive waste is within specified limits as specified in Table II-IB of the Second Schedule.

(5) The waste generator shall exercise the necessary diligence activities associated with his undertaking or undertakings to minimize the volumes of the radioactive wastes to be produced.

(6) The waste generator shall ensure that he uses as practicably possible the minimum quantities of radioactive materials which are compatible and in accordance with the requirements of his undertaking or undertakings.

(7) The waste generator shall establish working rules and control measures, such as to guarantee that the waste packages to be sent for storage or disposal as radioactive waste, are in accordance with the given information to activity content, waste form and quality of waste package.

Responsibilities of Radioactive material coordinato

(8) Each waste generator shall appoint a technically competent person with the appropriate independence and authority to be radioactive materials coordinator or radioactive waste coordinator.

8. The Radioactive materials Coordinator appointed under paragraph (9) of regulation 7, in addition to assisting persons using radioactive materials in safe and efficient non-site radioactive waste management, shall have the following responsibilities:-

(a) To establish, maintain and keep up-to date an inventory of radioactive materials and generated waste;

(b) To make and maintain contact with all on-site persons using radioactive materials and provide an authoritative point of advice and guidance;

(c) To liaise as needed with the Central Radioactive Waste Management Facility Authority;

(d) To establish and maintain a record keeping system in such a manner as to facilitate identification, characterization, collection and storage of radioactive materials that become waste;

(e) Ensure that on-site transfer of radioactive materials and waste is carried out in accordance with written safety procedures;

(f) To ensure that preparation of waste for transport to the central radioactive waste Management Facility meets Transport Regulations as provided for under paragraphs (1) and (2) of regulation 20;

(g) To ensure appropriate shielding, labeling, physical security and integrity of waste packages;

(h) To ensure that any discharge of effluent is made within clearance levels or authorized limits;

(i) To ensure that the disposal of solid waste to a local dump site is below clearance levels;

(j) To report on accidents and inappropriate waste management practices to the facility management.

9-(1) No person shall generate or manage radioactive waste without an appropriate license from the Regulatory Body.

(2) No person shall dispose of any radioactive waste unless the disposal facility designed and constructed specifically for the purpose is available and licensed.

(3) Proposals from applications to generate radioactive waste resulting from use of radioactive materials shall specify the following in written: application to the Regulatory Body.

(a) Nature and purpose of the proposed facility and equipment that generates radioactive waste;

(b) Suggested operational procedures, taking into consideration reduction of radioactive waste generation to the extent practicable;

(c) Quantity, type and characteristic of the radioactive waste to be generated;

(d) Proposed destination for the radioactive waste;

(e) Safety analysis report and environmental impact assessment of the facility both under normal and accident conditions;

(f) Decommissioning procedures;

(g) Availability of competent staff and provisions for its further training;

(h) Systems for records keeping and reporting;

(i) Proposed quality assurance programme;

(j) Contingency plans in the event of an emergency;

(k) Proposals for discharge and environmental monitoring as needed;

(l) Supporting research and development proposals as needed;

(m)Such other details as the Regulatory Body may consider necessary.

(4) An applicant shall pay fees prescribed by the Regulatory Body to cover the cost of the licensing procedures.

(5) The licensee shall comply with all limits and conditions specified in the licence including the amounts and characteristics of waste which may be generated, and stored, and any specific radiation protection and physical security measures.

(6) Any licence issued under paragraph (5) of regulation 9 shall be:-

(a) Valid for such a period as the Regulatory Body may determine;

(b) Renewable by the Regulatory Body if the licensee complies with the license conditions;

(c) Subject to supervision or revocation as notified in writing if in the view of the Regulatory Body, the licensee has failed to comply with license conditions;

Return of sources to suppli

10. A person that proposed to import a sealed source containing radioactive material which ten years after purchase shall have an activity greater than 100MBq shall:-

(a) Require the supplier, as a condition of purchase or of any gift, to receive the source back after its useful lifetime within one year of the recipient requesting such return, provided that the recipient seeds to return the source to the supplier not later than 15 years after purchase or receipt;

(b) Submit to the Regulatory Body a copy of relevant parts of the contract acceptance document and obtain its written agreement prior to entering;

(c) Return the source to the supplier within 15 years or if later send it to the Central Radioactive Waste Management Authority for any conditioning and storage at the cost of the waste generator.

Modification

11. If a modification to an existing practice or source is required by the Regulatory Body, in order to comply with some requirement of these Regulations, such a requirement shall take effect within such period as may be determined by the Regulatory Body.

Public involvement

12. The Regulatory Body shall ensure the public accessibility to facility's programs to improve understanding of waste management issues.

PART III
WASTE MANAGEMNT OPERATIONS

Segregation collection and characterization

13-(1) The generator shall keep control on waste generation to the minimum practicable as provided for under paragraphs (6) and (7) of regulation 7

(2) The waste generator shall segregate, collect and characterize waste as far as practicable at the point of origin in accordance with the categories specified in regulation 4 in order to facilitate subsequent treatment, conditioning, storage and disposal. Each waste category after segregation shall be kept separately in a suitable container. Sufficient number of containers shall be available where radioactive waste are generated. The waste containers shall:-

(a) be easy to handle;
(b) be strong enough to withstand normal handling;
(c) not be affected by the content

Container labeling

14-(1) The licensee shall ensure that each container containing radioactive waste bears a durable, clearly visible label bearing the radiation symbol. The label shall be legible for the whole period of storage and must provide the following information:-

(a) Nature of the waste generated (as prescribed in paragraph (a) of regulation 4);
(b) Date of waste generations;
(c) Commencement date of storage;
(d) Content of major radiological significant radionuclides;
(e) External surface dose rate;
(f) Waste category;
(g) Biological, chemical or other hazardous materials if they exist;
(h) Name of a person or organization responsible for the waste generation;
(i) Identification number; and
(j) Any other particular information that may be required by the Regulatory Body.

Procedure for discharge of radioactive substance to the environment

15-(1) A licensee shall ensure that radioactive waste is not to be discharged or released to the environment unless:-

(a) The waste activity or concentration have been confirmed to be below clearance levels as prescribed in Table II – B of the Second Schedule.
(b) Discharge of liquid or gaseous effluents is within the limits authorized by the Regulatory Body.
(c) The discharge or release of liquid effluent under subparagraph;
(d) Above shall take into consideration the following:-

(i) Acidic waste to be neutralized and, if necessary, filtered before they are discharged into the sewage system;
(ii) On each release occasion flushing shall be carried out with considerable quantities of water;

(iii) Release of radioactive waste shall be confined to one release point for each laboratory. The release point shall be marked by a visible sign showing that radioactive waste may be released into the sewage system;

(iv) Patients who have been administered radionuclides in connection with diagnosis or treatment shall use a separate toilet marked and identified for that purpose, and that flushing to be adequate after each use.

(v) Non aqueous waste or immiscible liquid waste shall not be discharged into sewers.

(2) The licensee before initiating the discharge to the environment of any solid, or gaseous radioactive waste considered to be within discharge limits, shall appropriate:-

(a) Determined characteristics and activity of the material to be discharge and the potential points and methods of discharge;

(b) Determined by an appropriate preoperational model study, significant exposure pathways by which discharge radionuclide's shall deliver public exposure;

(c) Assess the doses to the critical groups due to the planned discharges;

(d) Submit this information to the Regulatory Body as an input to the establishment of authorized discharge limits and conditions for their implementation.

(3) The licensee during the operational stages of radioactive waste management shall:-

(a) Keep all radioactive waste discharge below authorized discharge limits;
(b) Monitor the discharges of radionuclide's with sufficient detail and accuracy to demonstrate compliance with the authorized discharge limits and to permit estimation of the exposure of critical groups;
(c) Record the monitoring results;
(d) Report promptly to the Regulatory Body any discharges exceeding the authorized discharge limits in accordance with reporting criteria established by the Regulatory Body.

Discharge of exempt waste

(16)-(1) The waste category prescribed in subparagraph (i) of paragraph (b) of regulation 4 that is expected to decay below clearance levels within one year from its generation, shall be safety stored on-site and after confirmation by measurements or other means that the clearance levels specified in Table II-IB of second schedule have been reached, shall be appropriately discharged or released by the licensee or the authority of Central Radioactive Waste Management Facility.

(2) The licensee may discharge the exempt liquid effluent into sanitary sewer only if the material is readily soluble or is readily dispersible in water.

(3) a licensee may release the exempt sold waste into a waste incinerator or local dump site.

(4) A licensee may discharge exempt gaseous waste into the atmosphere.

(5) Radioactive waste contaminated with toxic compounds or infectious agents which are covered by regulations dealing specifically with these hazardous characteristics, shall be only discharged as per provisions of these Regulations.

Release of specific waste

17-(1) The licensee may release the following materials as if it were not radioactive:-

(a) 0.05μCi (1.85Bq), or less of hydrogen – 3 or carbon – 14 per gram of mediur waste used for liquid scintillation counting; and

(b) 0.05µCi (1.85Bq), or less of hydrogen 3 or carbon – 14 per gram of animal tissue, averaged over the weight of the entire animal.

(2) The licensee may not dispose of tissue under sub-paragraph (b) of paragraph (1) of regulation 17 in a manner that shall permit its use either as food for humans or as animal feed.

Waste storage

18-(1) The licensee shall arrange and make provisions for interim storage of radioactive waste prior to its clearance or discharge. The interim storage facility shall be properly designed and constructed with at least one physical barrier between the radioactive waste and other material in store. The store shall be large enough o hold all generated and anticipated waste in a orderly manner and keep different categories separated. In addition, the store's design shall provide for:-

(a) Adequate shielding of the radioactive waste;
(b) Prevention of deterioration of waste packages;
(c) Handling retrievably waste packages;
(d) Adequate ventilation if volatile radioactive substances may be present in the waste;
(e) Conventional safety;
(f) Physical protection

(2) The radioactive waste store shall so far as is practicable not contain or be located close to any corrosive, explosive or flammable materials and shall be clearly and legibly marked with the radiation symbol.

Preparation for transportation of waste

19-(1) the authority of the Central Radioactive Waste management Facility shall be provided with full information on the radioactive waste to be sent to it prior to delivery. If incomplete or incorrect information is given, the authority of the Central Radioactive Waste Management Facility at the expense of the waste generator, shall make the necessary investigation and shall send a report to the Regulatory Body for instructions regarding receiving such waste and its further management.

(2) The radioactive waste to be transported to the Central Radioactive Waste Management Facility shall be prepared by the waste generator in accordance with requirements developed by the Central Radioactive Waste Management Facility as approved by the Regulatory Body.

(3) The Radioactive Materials Co-ordinator shall supervise the preparation of radioactive waste for the transportation and in particular check that adequate shielding, labeling and documentation is provided.

20-(1) Transportation of radioactive waste within the nuclear installation shall be performed by a licensee under separate operating instructions issued by the Management and approved by the Regulatory Body.

(2) The off-site transportation of radioactive waste shall be in accordance with the relevant national Transport Regulations on hazardous materials and international Atomic Energy Agency Safety Series Nos. 6, 7 and 37 as revised from time to time and as stipulated in other international Atomic Energy Agency Regulations. For international transport, other relevant Regulations and/or agreements shall apply.

(3) without prejudice to any existing or anticipated law or regulations on the safe transport of radioactive materials in force or which shall come into force at the time these Regulations are in force, the following shall be taken into consideration in relation to the off-site transport of radioactive wastes:-

(a) The radioactive waste packages shall be transported in containers or special vessels using a special car;
(b) Waste transporting car shall not be used for public transport;
(c) The car shall be covered and the internal walls be painted such that it can be easily decontaminated;
(d) The car shall be provided with loading and unloading means.

(4) The Regulatory Body shall be notified at least fourteen days in advance of any off-site transfer of radioactive waste. The waste generator shall ensure that an acknowledgement receipt of the dispatched radioactive waste is received by him within fourteen days. Any shipment, of which acknowledgement is not received within the specified time, shall be investigated by the sender and a report shall be prepared and submitted to the regulatory body within one week after completion of the investigation but as soon as practicable and not later than twenty eight days after the date of shipment.

21. The Authority of the Central Radioactive Waste Management Facility shall treat the radioactive waste received from the waste generators in order to reduce its volume and to facilitate further conditioning. The treatment method shall be suitably selected for the radioactive waste received depending on such factors as the volume and type of the radioactive waste, the discharge requirements for liquid effluent and additional conditioning requirements. Treatment

22-(1) The radioactive waste to be accepted for long term storage, transportation and disposal shall be properly conditioned by the Central Radioactive Waste Management Facility operators. Conditioning

(2) Waste packages produced by a conditioning process shall be fully characterized with regard to important physical, chemical, radiological, properties specified by the Regulatory Body.

(3) The waste packages to be transported off-site shall comply with requirements stipulated under section 20(2) and shall meet waste acceptance requirements for disposal.

(4) Radium sources shall be conditioned for storage with regard to the latest internationally accepted technology.

Proposal of radioactive waste

23. Where the radioactive waste dose not qualify for discharge or release to the environment or for clearance in a reasonable period of time, it shall be stored in the Central Radioactive Waste Management Facility pending availability of appropriate disposal option.

Quality assurance

24-(1) The licensee shall ensure that all Radioactive Waste Management operations are carried out in accordance with a suitable quality assurance programme commensurate with the scope of activities and approved by the Regulatory Body. The quality assurance programme shall be planned to ensure that the facilities and equipment are designed, constructed and operated in accordance with specified requirements for sage operation, Regulations and conditions in a license are complied with, and the radioactive waste packages produced meet the waste package acceptance requirements.

(2) Each licensee shall develop and maintain an accurate and complete documentation system to cover all stages of Radioactive Waste Management from its generation to disposal. The quality assurance programme shall provide for controlled approval, receipt, retention, distribution and disposition of all records important for safety in accordance with the Regulatory Body's requirements. Records, such as letters, drawings, specifications, etc. must include all pertinent information, such as stamps, initials and signatures. Each record must be legible throughout the specified retention period.

(3) The licensee shall retain the records until the Regulatory Body terminates each pertinent license requiring the record.

(4) The licensee shall maintain adequate safeguards against tampering with and loss of record.

(5) The effectiveness of the quality assurance programme including those of the Regulatory Body shall be verified by independent audits to ensure that a Radioactive Waste Management programme meets specific requirements, is covered by procedures, and that implementation is adequate.

Physical protection

25. Waste generators and the authority of the Central Radioactive Waste Management Facility shall ensure adequate Physical protection measures to prevent any unauthorized access to the Radioactive Waste Management Facilities.

PART IV
REPORTING TO THE REGULATORY BODY

Inventory and reporting

26-(1) The licensee shall prepare and maintain an inventory of existing and anticipated radioactive wastes and submit it to the Regulatory Body and whenever significant changes in radioactive waste amounts of characteristics occur.

The inventory shall be based on the classification system specified in regulation 4, including information on important physical, chemical and radiological characteristics in addition to the quantity of the radioactive waste. The radioactive waste inventory shall be submitted in a form stipulated by the Regulatory Body.

(2) Each licensee shall report to the Regulatory Body immediately after its occurrence becomes known to him, and lost stolen or missing radioactive waste under such circumstances that it appears that an exposure may result to persons in unrestricted areas. Within thirty days after such occurrence, the licensee shall make a written report with a description of the radioactive material involved, it's probable disposition, the circumstances under which the loss or theft occurred, and actions that have been taken.

(3) Each licensee shall immediately report to the Regulatory Body any event involving radioactive waste possessed by the licensee that may have caused or threatens to cause the release of radioactive material, inside or outside of a restricted area. So that the individual could have received an intake in excess of one occupational annual limit on intake.

(4) The Central Radioactive Waste Management Facility shall keep annual records that specify details of quantities and types of:-

(a) The exempt waste disposed of at a local dumping site, sewer system or to the atmosphere;

(b) The effluents discharged into the environment within authorized release limits;

(c) The conditioned radioactive waste in storage;

(d) The conditioned radioactive waste dispatched to a disposal facility;

(e) The spent radiation sources sent to supplier.

27-(1) The licensee shall establish written procedures and have equipment available to:-

(a) Deal with any emergency involving Radioactive Waste at their Facilities. The procedure shall also, when appropriate, include unplanned event outside the normal working area, for instance during transportation; and
(b) Inform the Regulatory Body without delay of any emergency in relation to radioactive waste.

(2) The authority of the Central Radioactive Waste Management Facility shall establish written procedures and have equipment available to deal with emergencies involving transport and when requested by the waste generator to advise or assist with any emergency at a waste generator's facility.

PART V
FINANCING

28-(1) The waste generator shall secure adequate funds for the management of the radioactive waste.

(2) The waste generator dispatching Radioactive Waste to the Central Radioactive Waste management Facility for treatment, conditioning, storage and or disposal services may be charged such fee or fees as determined by the Regulatory Body.

PART VI
VERFIFICATION AND ENFORCEMENT

Right to entry and inspections

29-(1) Any person appointed and authenticated by the Regulatory Body to be the Inspector to control the safety of radioactive waste management my enter at any reasonable time the premises of any licensee, and any other premises where he has reason to suspect that radioactive waste is present, carry out inspections and tests, take samples and photographs, bring in equipment or other experts if he or she has a reason to believe that the radioactive waste may endanger human health or the environment.

(2) The Inspector may recommend to the Regulatory Body that generates or processes radioactive waste to shut down or stop activities of the waste generator if he believes that the safety is jeopardized.

(3) Each licensee in his premises shall assist the Inspector in his or her duties.

PART VII
OFFENCES AND PENALTIES

Failure to produce a license

30-(1) Any person who without reasonable excuse, fails to produce a license which required by these Regulations is guilty of an offence.

(2) A person who commits or commits an offence specified under the provision of paragraph (1) of these regulations is liable on conviction to a fine not less than Fifty Thousand Shillings or to imprisonment for a term not less than three years or to both that fine and imprisonment.

Obstruction

31-(1) Any person who willfully obstructs a radioactive material coordinator or inspector i his duties provided for by these Regulations is guilty of a offence

(2) A person or persons or organization who commits or commit an offence specified under the provision of paragraph (1) of this regulation is liable on conviction to a fine not **less than forty thousand shillings or to imprisonment for a term of not less than two years or to both that fine and imprisonment.**

Other offences

32. Any person or persons who knowingly, willfully and without any reasonable excuse contravenes, fails or refuses to comply with any other provisions of these Regulations in relation to which contravention, failure or refusal no specific penalty is provided, is guilty of an offence and is liable on conviction to a fine of not less than Twenty Five Thousand Shillings or to imprisonment for a term of not less than one year or to both such fine and imprisonment.

Offences by body corporate

33. Any act or omission which is an offence under these Regulations shall if done by a body corporate be deemed to be an offence committed by every Director, Secretary or Manager of the body corporate unless he proves that offence was committed without his knowledge or his consent and that he exercised such diligence to prevent the Commission of the offence as he ought to have exercised having regard to the nature of his functions and the circumstances of the case.

Appeals

34. Any person who is aggrieved at the failure of the Regulatory Body to issue or renew any license or considers that the Regulatory Body has revoked or suspended a license or attached any unreasonable conditions or limits to a license, may appeal to the minister and if the minister is convinced that the person or organization has been unreasonably treated he may require the Regulatory Body to take an appropriate defined action.

FIRST SCHEDULE

DISCHARGE OF RADIOACTIVE WASTE

Waste may be released into the atmosphere, discharged into the public sewer system, incinerated in an incinerator or sent for disposal into a local dump site provided, that annual limits of intake indicated below are not exceeded. There are different ALI values for oral intake as opposed to inhalation. ALI minimum (ALI_{mim}) for each radionuclide means the lesser of these value. Each waste generator or the Central Radioactive Waste Management Facility may discharge waste in quantities not exceeding $10AALI_{mim}$ per year.

Table II-IB of the Second Schedule gives the numerical values of ALI_{mim} for members of the public for the most frequently used radionuclide. The values (Waste clearance levels) area the ones to be used in the equations below:-

1. If the waste in solid, liquid and gas contains more than one radionuclide the highest permitted activity per year shall be calculated in accordance with equation (1). The total activity, however, shall not exceed 5MBq per year.

$$\Sigma \frac{A_k}{} \leq 10 \quad \ldots\ldots (1)$$

ALI_{mim}
A_k is the activity of radionuclide
ALI_{min} values are in schedule II table II-IB for radionuclide k.

2. If the waste in solid, liquid or gas contains more than one radionuclide the highest permitted activity per month shall be calculated in accordance with equation (2). The total activity however, shall not exceed 1 ALI_{mim}

$$\frac{A_k}{ALI_{mim}} \leq 1 \quad \ldots\ldots (2)$$

The total activity, however, shall not exceed 5MBq per year.

3. If the waste in solid, liquid or gaseous form contains more than one radionuclide then the highest activity in one individual discharge shall be calculated in accordance with equation (3). The maximum activity in each waste package or per release shall not exceed 0.1 ALI_{mim} or 0.05MBq whichever is less per individual discharge.

$$\frac{A_k}{ALI_{mim}} \leq 0.1 \quad \ldots\ldots (3)$$

Note: (a) The dose rate at a surface of the solid waste package to be sent to a local dump site shall not exceed 5 Sv/h.

(b) For solid waste, equation 3 applies only for a single individual waste package.

(c) When a waste package is to be sent to an incinerator or dump site the package shall carry the following information:-

(i) a statement that 'this waste package is exempted from nuclear control according to the Radioactive Waste Management Regulations'.
(ii) name and address of sender;
(iii) signature of sender.

Records of discharged exempt waste shall be established by the generator and kept for at least ten years. The records shall be available for inspection by the Regulatory Body.

SECOND SCHEDULE

A. OCCUPATIONAL MINIMUM ANNUAL LIMITS ON INTAKE ALI $_{MIM}$ (BQ) OF RADIONUCLIDE BY WORKERS BASED ON THE 1990 RECOMMENDATION AS GIVEN IN ICRP PUBLICATION 61 VOL 21 NO. 4

According to its definition, the ALI value is the activity which if inhaled or ingested would result in a dose of 20 mSv/year (ICRP 60). This dose is the annual limit of intake for radiation workers. Table II-IA gives a list of intakes for the most frequently used radionuclide's leading to doses of 20mSv. The values in the smaller of the ALI values for ingestion or inhalation.

NB: "ICRP" means 'International Commission on Radiological Protection'.

Table II-IA (Occupational ALI$_{mim}$)

NUCLIDE	Bq
H-3 Water	1.00E+09
C-14	4.00E+07
F-18	4.00+08
Na-22	1.00E+07
Na-24	5.00E+07
P-32	8.00E+06
P-33	8.00E+07
S-35	1.00E+08
Ci-36	2.00E+07
Ci-38	2.00E+08
K-40	4.00E+06
K-42	5.00E+07
K-43	9.00E+07
45Ca	1.00E+07
Ca-47	1.00E+07
Cr-51	5.00E+08
Mn-51	1.00E+07
Mn-52	3.00E+08
Mn-54	2.00E+07
Mn-56	2.00E+07
Fe-52	1.00E+07
Fe-55	3.00E+07
Fe-59	5.00E+06
Co-56	3.00E+06
Co-57	3.00E+07
Co-58	1.00E+07
Co-60	2.00E+06
Ni-63	2.00E+07
Cu-64	2.00E+08

Table II-IA (Occupational ALI Min) [contd]

NUCLIDE	Bq
Cu-67	5.00E+07
Zn-62	2.00E+07
Zn-65	4.00+06
Ca-67	5.00E+07
Ga-68	8.00E+07
As-73	2.00E+08
As-74	2.00E+07
As-75	9.00E+06
Br-76	9.00E+06
Br-77	5.00E+07
Br-82	2.00E+08
Rb-81m	4.00E+07
Rb-86	2.00E+09
Rb-88	4.00E+08
Rb-89	8.00E+06
Sr-87m	5.00E+08
Sr-87m	2.00E+08
Sr-90	4.00E+08
Y-90	4.00E+09
Tc-99m	7.00E+06
Tc-99	4.00E+05
In-113m	5.00E+06
Sb-124	1.00E+09
1-123	1.00E+09
1-125	3.00E+07
1-129	9.00E+08
1-130	6.00E+06
1-131	9.00E+07
1-132	1.00E+06
Cd-109	1.00E+06
Cd-115	1.00E+07
In-111	5.00E+07
Cs-129	3.00E+08
Cs-130	7.00E+08
Cs-131	3.00E+08
Cs-134	1.00E+06
Cs-134m	1.00E+09
Cs-137	1.00E+06
Ba-131	4.00E+07
Ba133m	3.00E+07
Ba-135m	4.00E+07

Table II-IA (Occupational ALI Min) [contd]

NUCLIDE	Bq
La-140	8.00E+06
Yb-169	1.00E+07
Ir-192	6.00+06
Au-198	1.00E+07
Hg-197	6.00E+07
Hg-203	2.00E+07
Ti-201	3.00E+08
Ti-204	3.00E+07
Pb-212	1.00E+04
Pb-210	5.00E+05
Pb-212	2.00E+04
Ra-226	9.00E+03
Th-232	9.00E+01
U-238	9.00E+04
Am-241	3.00E+02
Cm-244	5.00E+02
Cf-252	9.00E+02

B. ANNUAL LIMITS OF INTAKE BY MEMBERS OF THE PUBLIC FOR THE COMMONLY USED RADIONUCLIDE'S AS DERIVED FROM ANNUAL LIMITS OF INTAKE BY WORKERS BASED ON THE ICRP PUBLICATION 61 Vol. 21 No. 4

In order to ensure that radiation doses to individual members of the public are very small, quantities of radionuclide's released have to be limited to amounts that if totally ingested or inhaled, would not result in doses greater than the exempt dose of 10μSv/year. In practice, these quantities are framed as some fraction of the Annual Limit of intake (ALI) introduced by the International Commission on Radiological Protection (ICRP) for either ingestion or inhalation. Hence, 0.05% of the ALI for workers would result in a dose of ten micros event (10μSv). Thus the total intake approach results in a derived exemption level of 0.05% of the smaller of the ALI values for inhalation or ingestion given in Table II-IA.

Table II-IB gives a list of the total intakes for the frequently used radionuclide's leading a dose of ten (10) microsievert (μSv).

TABLE II-IB (Waste Clearance Levels)

NUCLIDE	Bq
H-3 Water	500,000
C-14	20,000
F-18	200,000
Na-22	5,000
Na-24	25,000
P-32	4,000
P-33	40,000
S-35	50,000
Ci-36	10,000
Ci-38	100,000
K-40	2,000
K-42	25,000
K-43	45,000
45Ca	5,000
Ca-47	5,000
Cr-51	250,000
Mn-51	5,000
Mn-52	150,000
Mn-54	10,000
Mn-56	10,000
Fe-52	5,000
Fe-55	15,000
Fe-59	2,500
Co-56	1,500
Co-57	15,000
Co-58	5,000
Co-60	1,000
Ni-63	10,000
Cu-64	100,000
Cu-67	25,000
Zn-62	10,000
Zn-65	2,000
Zn-69m	25,000
Ca-67	40,000
Ga-68	100,000
As-73	10,000
As-74	4,500
As-75	4,500
Br-76	25,000
Br-77	100,000
Br-82	20,000
Rb-81m	1,000,000
Rb-81	200,000
Rb-86	4,000
Rb-88	100,000
Rb-89	200,000
Sr-87m	2,000,000
Sr-87m	20,000
Sr-90	3,000
Y-90	2,500
Tc-99m	500 000
Tc-99	500,000
Mo -99	15,000
In-113m	450,000
Sb-124	3,000

1-123	45,000
1-125	500
1-129	100
1-130	5,000
1-131	400
1-132	35,000
Cd-109	500
Cd-115	5,000
In-111	25000
Cs-129	150,000
Cs-130	350,000
Cs-131	150,000
Cs-134	500
Cs-134m	500,000
Cs-137	500
Ba-131	20,000
Ba133m	15,000
Ba-135m	20,000
La-140	4,000
Yb-169	5,000
Ir-192	3,000
Au-198	5,000
Hg-197	30,000
Hg-203	10,000
Ti-201	150,000
Ti-204	15,000
Pb-212	5
Pb-210	250
Pb-212	10
Ra-226	4.5
Th-232	0.045
U-238	45
Am-241	0.15
Cm-244	0.25
Cf-252	0.45

THIRD SCHEDULE

A. PRINCIPAL NUCLIDES USED IN MEDICINE, CLINICAL MEASUREMENTS AND BIOLOGICAL RESEARCH

As a guideline to the proper waste management procedures table III- A below gives a list of principal radionuclide's used as open sources in life sciences. The half life, principal application, typical quantities per application and emanating waste types have been projected for each radionuclide listed. It is hoped that such a guideline will be a good tool towards the implementation of effective radioactive waste management practice.

RADION UCLIDE	HALF-LIFE	PRINCIPAL APPLICATION	TYPICAL QUANTITY PER APPLICATION	WASTE TYPES
^{3}H	12.26a	Clinical measurements biological research labeling	Up to 5 MBq Up to 50 GBq	Solid orange solvents, Gaseous
^{14}C	5950a	Biological research labeling	Less than 1 GBq up to 10 MBq	Solid, liquid, organic solvents, exhaled CO_2
^{22}Na	2.6a	Clinical Measurements Biological Research	Up to 50 KBq	Solid liquid
^{24}Na	15^{h}	Clinical measurements	Up to 5 GBq	liquid
^{32}p	14.3d	Therapy Biological Research	Up to 200 Bq Up to 400 MBq	Solid liquid
^{35}S	87.4d	Clinical Measurements Biological Research	Up to 5 GBq	Solid liquid
^{36}Ci	105a	Biological Research	Up to 5 MBq	Gaseous solid
^{45}Ca ^{47}Ca	164d 4.5d	Clinical Measurements Biological Research	Up to 100 MBq Up to 1GBq	Mainly solid Some liquid
^{51}Cr	27.7d	Clinical Measurements Biological Research	Up to 5 MBq Up to 100 KBq	Mainly liquid
^{57}Co	271.7d 60.8d	Clinical Measurements	Up to 50 KBq	Solid liquid
^{58}Co	5.26a	Check sources Biological Research Therapy	Up to 100 KBq	Solid
^{59}Fe	44.6d	Clinical Measurements Biological research	Up to 50 MBq	Mainly liquid
^{99}Tcm	6.0h	Clinical Measurements Biological research	Up to 600 MBq	Solid liquid
^{67}Ga	78.26h	Clinical Measurements	Up to 200 MBq	Solid
^{75}Se	119.8d	Clinical Measurements	Up to 11 MBq	Solid liquid
^{85}Sr	64.8d	Clinical Measurements	Up to 50 MBq	Solid liquid

[contd]

RADIONUCLIDE	HALF-LIFE	PRINCIPAL APPLICATION	TYPICAL QUANTITY PER APPLICATION	WASTE TYPES
^{89}Sr ^{90}Sr	50.5d 28.5a	Measurements biological research Therapy	Up to 150 MBq Up to 1500 GBq	Solid
^{90}Y	64h	Therapy	Up to 120 MBq	Solid liquid
^{103}Pd	2.8d	Therapy	Up to 1500 MBq	Solid liquid
^{111}In	2.8d	Clinical measurements Biological Research	Up to 500 MBq	Liquid solid
^{123}I ^{125}I	13.2h 50d	Clinical Measurements Clinical measurements Biological Research Therapy Labeling	Up to 800 MBq Up to 500MBq Up to 500 MBq	Solid, liquid Occasionally vapor
^{133}I	8.04d	Clinical measurements Therapy Biological Research	Up to 500 MBq Up to 10 GBq Up to 50 MBq	Solid, liquid Occasionally vapor
^{133}Xe	5.25d	Clinical Measurements	Up to 200 MBq	Gaseous
^{137}Cs	30.1a	Therapy	Up to 500 TBq	Solid,
^{208}Tl	3.02d	Clinical Measurements	Up to 120 MBq	Solid liquid
^{192}Ir	74d	Sealed source therapy	Up to 500 GBq	Liquid
^{197}Hg	64.4h	Clinical Measurements	Up to 50 MBq	Solid, liquid
^{198}Au	2.7d	Clinical therapy	Up to 10 GBq	Liquid
^{241}Am	433a	Clinical Measurements	Up to 10 GBq	Solid

B. PRINCIPAL NUCLIDES USED IN SEALED RADIATION C. SOURCES IN INDUSTRY AND RESEARCH

As a guide towards effective radioactive waste management practices table III-B below gives a list of the principal radionuclide's used as sealed sources in industry and research. The half-life, principal application and the typical as spent sealed sources and waste management practices must be dealt with accordingly.

RADIONUCLIDE	HALF-LIFE	PRINCIPAL APPLICATION	TYPICAL ACTIVITY PER SOURCE
^{3}H	12.3a	Light sources, electron capture detectors, targets, electronic valves	From kBq up to 10 TBq
^{55}Fe	2.6a	X-ray fluorescence	Up to 5GBq
^{57}Co	271.7d	Calibration sources	Up to 100 MBq
^{60}Co	5.3a	Radiography, irradiators	Up to 400 PBq
^{63}Ni	100a	Electron capture detectors	Up to 50 GBq
^{85}Kr	10.76a	Thickness gauges, electronics valves	Up to 100 GBq
^{90}Sr	28.1a	Thickness and density gauges	Up to 10 GBq
^{134}Cs	2.1a	Density gauges	Up to 20 GBq
^{137}Cs	30a	Radiography, irradiators, density and level gauges well logging	Up to 400 PBq
^{147}Pm	2.62a	Thickness gauges, light sources	Up to 2 GBq
^{167}Yb	32d	Radiography	Up to 1 TBq
^{160}Im	128.6d	Radiography	Up to 1 TBq
^{192}Ir	74d	Radiography	Up to 5 TBq
^{210}Po	138d	Static eliminators	Up to 20 GBq
^{238}Pu	87.7a	X-ray fluorescence analysis	Up to 5 GBq
^{241}Am	433a	Density, level and thickness gauges, x-ray fluorescence, well logging, moisture detectors	Up to 500 GBq
^{252}Cf	2.6a	Moisture detectors, neutron sources	Up to 10 GBq

FOURTH SCHEDULE

USEFUL RADIOACTIVE MATERIAL AND RADIOACTIVE WASTE INVENTORY REPORTING FORM

As required under part IV of Regulation 26 of these Regulations a licensee shall prepare a report on Radioactive Waste and submit it to the Regulatory Body as appropriate. This form is intended to meet such a requirement and it should be duly completed by each licensee.

Monthly/Quarterly/Annual Reports

PERIOD: From ..... to .....

NAME OF INSTITUTION:.....

1. RADIOACTIVE MATERIALS RECEIVED

1.1: Sealed Sources

Date Receive	Nuclide	Activity and reference date	Suppler or Manufacturer	Identity Ser/No	Location or Room	Application or Use

If Space is not sufficient use additional sheets

1.2: Unsealed Sources

Date Receive	Nuclide	Activity and reference date	Suppler	Batch No.	Quantity (cm^3)	Location	Application or use

2. RADIOACTIVE MATERIAL(S) IN STOCK/CURRENTLY IN USE

2.1. Unsealed Sources

Nuclide	Activity and reference date	Suppler	Batch No.	Quantity (cm^3)	Location or Room	Remarks

3. RADIOACTIVE WASTE IN STORAGE

3.1. SOLID RADIOACTIVE WASTE EMANATING FROM UNSEALED SOURCE(s)

3.1.1. Combustible

Radionuclides container No.	Radionuclides contained	Quantity per container (cm^3)	Materials of the container	Activity in container (give ref. date)	Waste types	Storage location

3.1.2. Non Combustible

Radionuclides container No.	Radionuclides contained	Quantity per container (cm^3)	Materials of the container	Activity in container (give ref. date)	Waste types	Storage location

3.1.3. Compactable

Radionuclides container No.	Radionuclides contained	Quantity per container (cm^3)	Materials of the container	Activity in container (give ref. date)	Waste types	Storage location

3.1.4. Non-Compactable

Radionuclides container No.	Radionuclides contained	Quantity per container (cm^3)	Materials of the container	Activity in container (give ref. date)	Waste types	Storage location

3.2. SEALED SPENT SOURCES

Nuclide	Activity/ref. date	Suppler or manufacture	Identity/Sr/No.	Former application	Storage Location

3.3. LIQUID RADIOACTIVE WASTE

3.3.1. AQUEOUS Liquid Waste

Identity Number of containers	Material of the container	Quantity of waste (cm3)	Activity and Reference date	Indicate whether acidic or alkaline	Radionuclides in contained

3.3.2. ORGANIC LIQUID WASTE

Identity Number of containers	Material of the container	Quantity of waste (cm3)	Activity and Reference date	Indicate whether acidic or alkaline	Radionucledes in contained

4. RADIOACTIVE WASTE DISCHARGES (Report on Monthly Basis)

The discharges should be effected at or below clearance levels of radionuclide's as authorized by the Regulatory Body.

3.1 Combustible

Month	Quantity in cm^3	Principal Radionuclides	Place of discharge	Method of discharge	Total activity discharged	Discharge allowed by

3.2 Non-Combustible Waste

Month	Quantity in cm^3	Principal Radionuclides	Place of discharge	Method of discharge	Total activity discharged	Discharge allowed by

3.3 Compactable Waste

Month	Quantity in cm^3	Principal Radionuclides	Place of discharge	Method of discharge	Total activity discharged	Discharge allowed by

3.4 Non- compactible

Month	Quantity in cm3	Principal Radionuclides	Place of discharge	Method of discharge	Total activity discharged	Discharge allowed by

3.5 Sealed spent sources returned to supplier or transferred to another user. Please complete as required below.

Date on which source was returned or transferred	Address of person/organization accepting the source	Radionuclides	Activity and reference date	Former application	Return/Transfer authorized by

3.6 AQUEOUS Radioactive Waste

Month	Quantity in cm3	Principal Radionuclides	Place and or method discharge	Total activity discharged	Discharge authorized by

ORGANIC Radioactive Waste

Month	Quantity in cm3	Principal Radionuclides	Place and or method discharge	Total activity discharged	Discharge authorized by

REMARKS:-

If you have any remarks/comments please write them in the space below:-

.....

.....

.....

DECLARATION:

I ..... declare that the information on this form to the best of my knowledge is true and correct.

Name: ..... Signature and Official Stamp

.....

Position ..... Date .....

FIFTH SCHEDULE

UNITED REPUBLIC OF TANZANIA

NATIONAL RADIATION COMMISSION

P. O. BOX 743
ARUSHA

For official use only
License No. .....
Receipt No.....

APPLICATION FOR LICENSE AUTHORIZATION TO STORE AND OR DISCHARGE RADIOACTIVE WASTES
(to be completed by head of Organization)

1. **Application Details**
   Name and address of applicant
   .....
   .....
   .....

2. **The premises**
   2.1 The location of premises from which generation, storage or discharge of radioactive waste is expected.

   2.1.1. Generation .....

   2.1.2. Storage .....

   2.1.3. Discharge .....

   2.2 What are the premises used for? (indicate specific purpose(s) in which radioactive materials are used .....
   .....

   2.3 Name and qualifications of the Radioactive materials co-ordinator (RMC)
   .....
   .....
   .....

3. **Radioactive Waste**
   3.1. General
   3.1.1. How is radioactive waste produced? .....

.....

.....

.....

3.1.2. What steps will you take to minimize the production of radioactive waste? .....

.....

.....

.....

3.1.3. Will the production of radio-waste be continuous or for a limited time?
If Limited, give length of time ( ) year ( ) month.

3.2. Solid Radioactive Waste
3.2.1. Do you generate solid radiowaste? YES [ ] NO [ ]

If yes, answer the following questions:-
What are the physical properties of the generated solid waste (e.g. inflammable biologically hazardous etc)?.

.....

.....

.....

3.2.2. What are the expected volumes per month or year in m^3 of each type? .....

.....

.....

.....

3.3. Liquid Radioactive Waste
(a) Aqueous Radiowaste

3.3.1 Are you going to generate any aqueous radiowaste?
YES [ ] NO [ ]
If no go to section 3.5.(b)

3.3.2. What are the main chemical and physical properties of the liquid?

.....

.....

.....

3.3.3. What radionuclide's are expected to exist in the waste?

.....

.....

.....

3.3.4. What is estimated monthly maximum volume of aqueous radiowaste resulting from operations or processes before being diluted with other liquid waste?

.....

.....

3.3.5. Do you intend to perform controlled release of some aqueous radiowaste into the public sewer?

YES [ ] NO [ ]

If yes,

(i) What is the estimated monthly volume of aqueous waste discharged from the premises into the sewer? [m^3]

(ii) What is the estimated total activity per month of the radiowaste at the time of the controlled released? (Bq).

.....

.....

3.3.6 Does the system under your control, through which radiowaste is discharge, operate by gravity (without temporary hold in tanks etc) YES [ ] NO [ ] If No give details of delay ..... pumps, holding tanks, high level alarm etc. .....

.....

.....

3.3.7 Is this discharge system completely enclosed in engine. Instructed? YES [ ] NO [ ] In either ease, give details of the system .....

.....

.....

(May use additional sheets if necessary)

3.3.8. Give the same of the sewer system to which your discharge flow and indicate this is private or part of the municipal system.

3.3.9. Give the name of the watercourse or water body (e.g. river, lake ocean) or final destination into which the sewage discharges.

.....

.....

(submit environmental impact assessment)

(b) Organic Liquid Radiowaste

3.3.10. Are you going to generate any organic liquid radwaste?
YES [ ] NO [ ]
(i) If Yes
What nature of the radiowaste (solvents used)and how are they contained (e.g. In glass vials etc)?
.....

.....

(ii) Give details on management, storage and final release of radioactive waste .....
.....

.....

4. Storage of Radioactive Waste

4.1. Do you propose to store radioactive waste on premises?
YES [ ] NO [ ]
If No, go to section 5 and sign the declaration.
If Yes, continue with this section.

4.2. What are the physical properties of the radioactive waste
(e.g. Inflammable, biologically hazardous etc)?
.....

.....

.....

4.3. What is the maximum activity of each radionuclide to be stored?
.....

.....

.....

4.4. What is the maximum volume to be stored? [m^3]

4.5. What type of containers will be used for the waste?

.....

.....

.....

4.6. Give details of the place where radioactive waste is going to be stored eg. Building, room, security measures, fire alarm systems and presence of inflammable materials etc.

.....

.....

.....

4.7. How do you propose to record and label this radioactive waste? Refer section 4, 14 and item 3 of the fourth schedule of radiowaste management Regulations .....

.....

.....

4.8. What is your radiological impact assessment (submit with this application a safety analysis report of your storage facility of the proposed storage of this radioactive waste?

.....

.....

.....

{continue on a separate sheet if necessary}

Declaration

I ..... Declare that the information on this form is to the best of my knowledge and belief true and correct.

Signature of Applicant and Official Stamp .....

Title .....

Date.....

Please send your complete application forms to the address indicated below:-

Registrar,
National Radiation Commission
P. O. Box 743
ARUSHA

PIUS Y. NGWANDU,
Minister for Higher Education
Science and Technology

Dar es Salaam
1st September, 1999