

GOVERNMENT NOTICE NO. 4 published on 10/01/2018

THE MINING ACT,

(CAP. 123)

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**REGULATIONS**

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*(Made under sections 108(5) and 112)*

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THE MINING (RADIOACTIVE MINERALS) REGULATIONS, 2018

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*Regulation*

*Title*

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THE MINING ACT,

CAP. 123

**REGULATIONS**

*(Made under sections 108(5) and 112)*

THE MINING (RADIOACTIVE MINERALS) REGULATIONS, 2018

PART I

PRELIMINARY PROVISIONS

Citation	1. These Regulations may be cited as the Mining (Radioactive Minerals) Regulations, 2018.
Application	2.-(1) These Regulations shall apply in relation to exploration, mining, processing, tailing, storage, transportation, acquisition, disposal and exportation of radioactive minerals with a view to enhancing radiological safety, security and environmental protection.  (2) Nothing in these Regulations shall be construed as relieving any person from complying with other laws governing safety, health and the protection of the environment.  (3) The requirements of these Regulations are in addition to, and shall not be construed as abrogating application of other written laws.
Interpretation	3. In these Regulations, unless the context otherwise requires:-
Cap. 123	"Act" means the Mining Act; "abandonment of a mine" means the discontinuance of mining operations or mineral processing activities at the mine;

"background radiation" means radiation of man's natural environment originating primarily from the natural radioactive elements of the earth and cosmic rays;

"Becquerel (Bq)" means the System International (SI) unit of measurement of radioactivity, defined as one radioactive disintegration per second;

"Chief inspector" means the Inspector of Minerals appointed by the Commission under section 25;

"Commission" means the Mining Commission established by section 21 of the Act;

"competent authority" means any national or international regulatory body or authority designated or otherwise recognized as such for purpose of these Regulations;

"competent person" in relation to any duty or function means any person who has had Adequate training and experience to enable him to perform that duty or discharge that function without avoidable danger to himself or any other person;

"concentrate" means an extracted product that contains radioactive minerals and that results from the physical or chemical separation of radioactive element from its ore;

"contamination" means radioactive material deposited or dispersed in material or places where it should not be;

"curie (Ci)" means the basic unit used to describe the intensity of radioactivity in a sample of material and equal thirty seven billion disintegrations per second, or approximately the radioactivity of one gram of radium ;

"dose" means a general term denoting the quantity of radiation or energy absorbed in a specific mass or target;

"dose limit" means the value of the effective dose or equivalent dose to individuals from controlled practices that shall not be exceeded;

"effective dose" means a summation of the tissue equivalent doses each multiplied by appropriate weighting factor:

"EIA" in its acronym, means approved Environmental Impact Assessment done for the grant of special mining licences;

"Emergency Preparedness Plan" means a plan formulated by a holder to enable to encounter and deal with unexpected occurrences and circumstances during operations;

"Executive Secretary" means the Chief Executive Officer of the Commission;

"holder" means the person holding a mineral rights;

"IAEA" means the International Atomic Energy Agency;

"IAEA guidelines" means the International Standard Codes and Guidelines issued by IAEA from time to time;

"ionizing radiation" means the radiation of gamma rays and x-rays or corpuscular radiation, capable of producing ions, directly or indirectly, while passing through matter;

"licensee" means a person holding a license granted under the Act;

"manager" means a person appointed by the holder and approved by Chief Inspector to manage the exploration, mining operations or mineral processing in accordance with the provision of the Act;

"mineral rights" has the meaning assigned to it under the Act;

"Minister" means the Minister responsible for mining;

"NEMC" in its acronym, means the National Environment Management Council established under the Environment Management Act;

"plat" means a mineral process facility by which ore is extracted, processed and treated for the recovery of radioactive mineral concentrate, including any tailings-handling and water treatment system associated with the facility;

"Quantitative Radiological Hazard Analysis" means a system of explanation of identified and determined dangers of radioactive emissions during the full cycle of operations;

"Quantitative Radiological Hazard and Safety Assessment" means the identification and determination of the dangers arising out of radioactive emissions relating to safety, health and the environment;

"Radiation Hazard Assessment" means the identification of health, safety and environmental dangers arising out of radioactive emissions and the potential intervention measures;

"Radiation Operation Management Protection Plan" means a plan that sets out measures to safeguard employees, the public and the environment against exposure to radiation during operations;

"radioactive mineral" means a mineral, which contains by weight at least one-twentieth of one per centum of uranium or thorium or any combination and includes:-

- (a) monazite sand and other ores containing thorium; and
- (b) caronite, pitchblende and other ores containing uranium;

"radioactive mineral damage" means loss of life, personal

injury or any damage or material loss resulting directly or indirectly from the radioactive mineral or a combination of such properties of nuclear minerals or waste or hazardous radioactive mineral substance produced in, coming from or sent to radioactive mineral installation;

"radioactive material" means any matter or substance containing one or more radionuclides, activity or concentration of which is sufficiently intense to entail a significant risk or disability or disease to any person or organ on exposure;

"radioactive waste" means materials which are radioactive and for which there is no further use;

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"TAEC" in its acronym, means Tanzania Atomic Energy Commission established under Section 7 of the Atomic Energy Act;

"tailings" means any material remains after all economically recoverable metals or minerals of economic interest has been removed from the ore through milling and processing;

"Waste Management Plan" means a plan to manage all unwanted materials generated during prospecting, mining or processing operations;

"waste rock" means overburden and bedrock that shall be fractured and removed to gain access to or upgrade ore during mining operations."

PART II  
PROSPECTING, MINING AND PROCESSING OF  
RADIOACTIVE MINERALS

Prohibition on  
radioactive minerals  
Caps. 191,188 and Act  
No. 11 of 2009

4. A person shall not be authorised to prospect, mine, process or engage in any related activities for the exploration of radioactive mineral unless that person:-

- (a) is a holder of mineral rights obtained under the Act;
- (b) conforms to the standards provided for in the Environment Management Act, the Atomic Energy Act, the Water Resources Management Act and any other law relating to prospecting, mining, processing, transporting or storage of radioactive minerals; and
- (c) undertakes in writing not to involve in the production of nuclear weapons or devices and to observe the provisions of the Second Schedule to these Regulations.

Application for licence to prospect for mine or process radioactive minerals

5.-(1) An application for licence to prospect, mine or process radioactive minerals shall be in accordance with the provisions of the Mining Act.

(2) An application for licence referred to in sub-regulations (1) shall be accompanied by fees prescribed in the Third Schedule to these Regulations.

Permit on radioactive minerals

6.-(1) A person shall not acquire, store, transport, import or export radioactive minerals unless that person obtains a permit issued by the Commission under these Regulations.

(2) An application for a permit shall be filed in Form I specified in the Fourth Schedule to these Regulations.

Prospecting of radioactive minerals

7.-(1) A holder of a prospecting license for radioactive minerals shall not conduct any prospecting work or other related activity unless that person submits to Commission for approval the following plans:-

- (a) a Radiation Operation Management Protection Plan;
- (b) a Radioactive Waste Management Plan; and



- (c) a plan to Transport and Store Radioactive Ores and Products.
- Caps.188 and Cap. 191 (2) Copies of documents stipulated under sub-regulation (1) shall be submitted to the Tanzania Atomic Energy Commission and the National Environment Management Council.
- GN. No. of 2010 (3) In case of exploration for uranium, a holder shall in addition to requirements under this Regulation, comply with the provision of the Mining (Safe Working and Occupational Health) Regulations, 2010.
- Disposal of radioactive minerals 8.A holder shall make sure that the disposal of any radioactive mineral is done in a manner which shall not cause any harm or damage to any person, animal or the environment.
- Mining of radioactive minerals 9.-(1) A holder shall not conduct any mining operations for radioactive minerals unless the holder submits to the Commission for approval the following plans:-
- (a) a Radiation Operation Management Protection Plan;
  - (b) a Radioactive Waste Management Plan;
  - (c) a Plan to Transport and Store Radioactive Ores and Products;
  - (d) a Quantitative Radiological Hazard and Safety Assessment in accordance with the guidelines;
  - (e) a detailed Mine Water Management Plan for both natural and mine water, on and off site; and
  - (f) a project description which shall include, but not be limited to the following:-
    - (i) a scope of activities;

- (ii) a site plan with coordinates;
- (iii) a physical security plan; and
- (iv) an occurrence and incident reporting plan.

(2) A holder shall submit copies of the documents prepared in terms of subparagraph(1) to the Chief Inspector and NEMC.

(3) A holder shall prepare the radioactive waste management plan in a manner set out in the First Schedule to these Regulations.

(4) The Chief Inspector shall, in consultation with NEMC and the Basin Water Office, review annually the Mine Water Management Plans submitted in accordance with the details required under paragraph (e) of sub-regulation (1).

Radiation hazard assessment

10. A holder shall prepare radiation hazard assessment of the operation on activities involving radioactive minerals in a manner set out in the part II of the First Schedule to these Regulations.

Construction or plant and processing operations

11.-(1) A holder shall not construct a plant, unless he submits to the Commission and other relevant institutions for approval a description of the operating plant and concentrate recovery.

(2) The description of the plant and concentrate recovery referred to under sub-regulation (1), shall include:-

- (a) a description of the design of the proposed plant;
- (b) the proposed construction schedule and the contingency plans for construction;

- (c) a description of the components, systems and equipment proposed to be installed at the plant, including the design operating conditions;
- (d) results of a process hazard analysis and a description of how the results have been taken into account;
- (e) processing methods and programs;
- (f) a description of all proposed laboratory facilities and programs;
- (g) a proposed commissioning plan for the components, system and equipment to be installed at the plant; and
- (h) a detailed water management plan for both natural and plant water on and off site.

(3) A holder shall develop radiation operation managementprotection plan in a manner stipulated in the First Schedule to these Regulations.

Radioactive waste and tailings Impoundment

12.-(1) A holder shall develop and implement a radioactive waste and tailings impoundment system in accordance with the provisions of the Environment Management Act, and Atomic Energy Act.

Caps191 and Cap.188

(2) A holder shall develop a Waste Management Plan in amanner stipulated in the First Schedule to these Regulations and in accordance with appropriate technology in order to manage:-

- (a) radioactive waste;
- (b) plant tailings;
- (c) sub-economic materials; and
- (d) non-radioactive waste; and waste water.

(3) The holder shall minimize the environmental pollution by:-

- (a) demonstrating to the Chief Inspector, TAEC and NEMC that the radioactive waste management facilities are constructed in accordance with the approved designs referred to under Regulation 10 and the operational procedures are in place prior to commissioning the facilities; and
- (b) operating the facilities referred to in paragraph (b) for such period as the Chief inspector, TAEC and NEMC shall determine for the purposes of assessing the performance of the facilities.

(4) Institutions referred to in paragraph (b) of sub-regulation (3) shall, where the institutions are satisfied with the performance of the radioactive waste management facilities approve facilities, to be used for the routine mine or plant operations based on an approved monitoring and surveillance program.

(5) A holder shall inform, in writing the Chief Inspector, TAEC and NEMC of:-

- (a) any changes to the operation which may alter the nature or quantity of radioactive waste;
- (b) any proposal to change the waste containment system; and
- (c) any unanticipated circumstances that may affect performance of the Waste Management Plan.

(6) A holder shall ensure that the Waste Management Plan has a monitoring program capable to:-

- (a) verify the effectiveness of the engineering design;
- (b) validate models and predictions; and
- (c) demonstrate compliance with discharge limits, operational discharge limits and operational

discharge proceedings.

Caps 188,297and GN.  
No. of 2010

(7) Control and occupational health and public safety shall be made in accordance with the Mining (Safe Working and Occupational Health) Regulations, 2010 as well as the Atomic Energy Act and Occupational Health and Safety Act.

(8) The Chief Inspector shall, in consultation with NEMC, TAEC and the Basin Water Office, review annually the water management plans.

PART III  
GENERAL PROVISIONS

Medical  
examination

13. A holder shall ensure that a person shall not carry work involving radioactive mineral unless that person has passed a medical examination and is subjected to examination at all time as the physician deems it necessary.

Disposal of radioactive  
minerals

14. The disposal of any radioactive mineral shall be done in a manner which does not cause drainage to any person, animal and the environment.

Radioactive waste  
materials and  
contaminated  
equipment

15. A holder shall store contaminated equipment and materials in a secured and fenced off area and shall ensure that at all times the area has appropriate warning signs indicating the levels of radioactive hazards present in the area and that the signs are displayed in conspicuous locations.

Prospect, mine and  
plant de-  
commissioning closure  
and  
abandonment

16.-(1) A holder who intends to abandon a mine or plant site shall apply to the Commission and other relevant institutions in a manner specified in the Second Schedule to these Regulations and submit to the Commission for approval, a closure EIA, an updated mine decommissioning plan, and an updated environmental management plan.

- Cap. 188 (2) A holder who anticipates the closure of a mine or plant site, shall prepare and submit to the Commission for approval, a Quantitative Radiological Hazard Analysis in accordance with the Atomic Energy Act.
- Cap. 191 and GN. No. of 2004 (3) The closure of the mine or plant site shall be done in accordance with the requirements of the Environmental Management Act, 2004 and the Atomic Energy (Protection from Ionizing Radiation) Regulations, 2004 and these Regulations.
- Transportation and storage of radioactive of minerals 17. A holder shall transport and store radioactive minerals, ores and concentrates in accordance with the provisions of the Third Schedule to these Regulations.
- Marketing of radioactive minerals 18.-(1) A person shall not acquire, sell or export radioactive minerals except in accordance with the terms and conditions set out in the Regulations and upon approval granted by the Commission.
- (2) A holder who sells or exports any radioactive minerals concentrate shall-
- (a) provide documentation to TAEC for approval on the source of the radioactive minerals and to prove authenticity of the receiving agent and end-user in order to satisfy the requirements set out in the Second Schedule to these Regulations; and
- (b) report to the Minister and TAEC any internal movements of radioactive substances in order to safeguard public health and safety.
- Inspections and monitoring 19.-(1) A holder shall observe the implementation of the approved Radiation Operation Management Protection Plan and make available all records on demand by the Chief Inspector, TAEC, NEMC and any other competent authority.

(2) The Chief Inspector shall have the power to enter and inspect the operation at the mine or plant site in accordance with these Regulations.

(3) A holder shall formulate and implement a quality management system to cover all operations at a mine or plant site.

Appointment of  
Radiation Protection  
Officer

20.-(1) A manager shall appoint a competent person as a radiation protection officer whose qualifications and experience shall be subject to approval of the Chief Inspector in consultation with TAEC.

(2) Any appointment made under sub-regulation (1), shall not relieve the manager's responsibilities under these Regulations or under the Mining (Safe Working and Occupation Health) Regulations, 2010.

GN No.2010

(3) The manager of the mine shall:-

- (a) comply with and enforce the requirements of these Regulations and any lawful order given by the Chief Inspector in the interests of radiation protection and ensure they are observed by any person working in the mine;
- (b) take reasonable measures to provide for the radiation protection and proper discipline of persons employed at the mine;
- (c) as soon as is practicable after the occurrence of a breach of these Regulations, report to the Chief Inspector and such other competent authority, particulars of the breach and of any disciplinary steps taken and make record of such breach in open for inspection by competent authority and the Inspector; and
- (d) cause times of the working shifts of radioactive mineral mining and processing in every section of the mine be so arranged that the workmen are not be exposed to radiation which exceed dose limit.

*Mining (Radioactive Minerals) Regulations*

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*GN. No. 4 (contd...)*

Royalties

21. A holder shall pay to the Government of the United Republic a royalty in accordance with the provisions of the Act.

Review or approval  
from different  
Authorities

22.-(1) The review or approval from different authorities required to be made may be appealed against to the Chief Inspector.

(2) The Chief Inspector shall have over all powers and final decision on all matters concerning review of approval submitted from different authorities.

Offences and penalties

23. A person who contravenes any provisions of these Regulations, commits an offence and shall on conviction be liable to a fine of not less than ten million shillings and not more than one hundred million shilling or to imprisonment for a term of not less than one year and not more than five years.

Revocation  
GN. No.407  
of 2010

24. The Mining (Radioactive Minerals) Regulations, 2010 are hereby revoked.



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SCHEDULE  
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FIRST SCHEDULE  
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*(Made under regulations 10 and 11(3))*

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RADIATION OPERATION, MANAGEMENT PROTECTION PLAN AND RADIATION  
HAZARD ASSESSMENT

PART I  
RADIATION OPERATION MANAGEMENT PROTECTION PLAN

Radiation Operation Management Protection Plan Development of Plan	1-(1) A holder shall develop and implement a Radiation Operation and Protection Plan.
	(2)A Radiation Operation Management Protection Plan shall include-
	(a) sources of exposure;
	(b) control measures;
	(c) a record of monitoring;
	(d) estimates of costs of implementation of the plan;
	(e) education and training; and
	(f) reporting and record keeping.
Sources of Exposure	2. A Radiation Operation Management Protection Plan shall:-
	(a) identify all significant exposure sources and pathways; and
	(b) include plans of the mine or plant site, descriptions of the equipment to be used and process involved and estimates of the radionuclide concentrations in the process stream.
Control measures	3. A Radiation Operation Management Protection Plan shall-
	(a) describe the measures to be implemented to control radiation exposure; and

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*GN. No. 4 (contd...)*

- (b) include provision of engineering design for ventilation, dust or fume control measures and shielding.
- Monitoring                      4. A holder, shall submit for approval, a monitoring plan to Chief Inspector and copies to TAEC and NEMC, the monitoring plan shall-
- (a) comply with regulatory limits such as radiation doses received by individual or groups, and  
(b) provide information on the effectiveness of the engineering and protection control measures.
- Dose estimates                5. A holder shall provide estimates of radiation exposures or doses that may arise from the operation in order to determine the adequacy of the proposed control measures.
- Education and training      6. A holder shall provide appropriate education and training of staff on a continuous basis in all radiation protection aspects of the operations, first aid and general safety.
- Reporting and record keeping      7.-(1) A Radiation Operation Management Protection Plan shall include provisions for reporting the results of the monitoring program and related information.
- (2) A holder shall provide monthly flash reports to the Chief Inspector on any radiation occurrence or cases.
- (3) A holder shall provide quarterly reports on Radiation Operation Management Plan to the Chief Inspector, and copies to TAEC and NEMC.
- Record of monitoring        8.-(1) A holder shall retain records of monitoring results, dose assessments, calculation methods and related information in a manner that shall allow them to be retrieved and these records shall be available for inspection by the relevant regulatory authorities.
- (2) The records referred to under sub-paragraph (1) shall be submitted to the Chief Inspector and TAEC annually.
- (3) A holder shall develop and maintain appropriate measures to preserve the records at the close of a project in accordance with the requirements of the Act and any other written laws.
- Personnel and resources      9. A Radiation Operation Management Protection Plan shall include a commitment to provide adequate resources and staff with the appropriate qualifications and experience.

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*GN. No. 4 (contd...)*

Integration into operations and programs	10. A Radiation Operation Management Protection Plan shall include and be integrated into occupational health and safety programs and the operations as a whole.
Quality assurance	11. A holder shall implement a quality assurance program which is in compliance with national and international standards.
Calibration	12. A Radiation Operation Management Protection Plan shall include schedules and measures for calibration of equipment used in monitoring which shall conform to national and international standards.
Auditing	13. A system of auditing to check the performance of a Radiation Operation Management Protection Plan shall be implemented and shall include both internal and external auditing on an annual basis
Review and assessment	14.-(1) A holder shall review and assess a Radiation Operation Management Protection Plan periodically to achieve continual improvement in radiation protection  (2) The review referred to under sub-paragraph (1) shall include review of-  (a) the doses;  (b) trends overtime for both the operation as a whole and smaller areas or working groups;  (c) the monitoring plan to ensure that the frequencies and techniques remain appropriate; and  (d) administrative procedures and work practices.  (3) Subject to approval- of the Chief Inspector, a holder may amend or alter Radiation Operation Management Protection Plan.
Accident	15. A holder shall report any radiological accidents within twelve hours of the incident to the Chief Inspector, TAEC and NEMC and take appropriate steps to remedy the situation and prevent recurrence of the accident.
Review	16. The Radiation Operation and Protection Plan shall be subjected to annual by the holder to ensure adequacy of resources and effectiveness.

PART II  
RADIATION HAZARD ASSESSMENT

General requirements

17.-(1) A mineral right or license shall be granted on condition that the holder shall conduct a radiation hazard assessment of the operations and activities involving radioactive minerals.

(2) The assessment referred to under sub-paragraph (1) shall identify the following-

- (a) potential radiological hazards associated with prospecting, mining and processing of radioactive materials;
- (b) the effectiveness of the engineering and operational controls; and
- (c) determination of the magnitude of the radiological hazards from both normal operations and potential accidents to workers and public.

Radiological safety assessment

18.-(1) A holder shall make a radiological safety assessment of the prospecting, mining and processing operations and transportation of radioactive minerals.

(2) The main elements of assessment referred to under sub-regulation (1) shall contain-

- (a) identification and quantification of the prevailing levels of different radiological hazards;
- (b) identification of areas where the potential for radiation exposure of workers may result in an effective dose exceeding 1 mSv per year;
- (c) identification of individuals who may be occupationally exposed to
- (d) ionizing radiation and receive an annual effective dose in excess of 20mSv;
- (e) determination of the effective dose received by occupational exposed individuals; .
- (f) determination for radiation exposure of members of the public due to airborne and liquid effluent releases from the site and arising from the disposal Of radioactive waste;
- (g) assessment of the efficiency and effectiveness of the engineering
- (h) and operational controls; and
- (i) estimation of the magnitude of the risks resulting from accidents whether on site or off site.

19.-(1) As a minimum, a radiological hazard assessment shall identify the various radioactive types of materials present in the complete process and determine their physical and chemical form, nuclide composition, activity concentrations, and estimate total quantities to be mined and planted per annum;

- (a) identify local concentrations of radioactive material in the mining and processing per annum;
- (b) identify and quantify the radioactive doses to workers and members of the public who may have been exposed to radiation;
- (c) quantify the mean levels and variations of the radiological hazards during full working shifts and determine the magnitude of longer term fluctuations;
- (d) identify individuals occupational exposed to radiological hazards;
- (e) quantify the degree of individual occupational exposure in terms of the annual dose equivalent received from all radiation exposure pathways, for routine maintenance and repairs operations;
- (f) quantify the impact of radioactive emissions from the site in terms of the annual effective dose received by the public;
- (g) collect appropriate data on parameters which impact on the extent and magnitude of radiological hazards, such as ventilation flow rates and patterns in underground mining, the efficiency of ventilation and dust control practises, working practises and their impact on levels of radiological hazard;
- (h) assess the transportation of final product and by-products in terms of the potential occupational radiation exposure of workers and the public;
- (i) assess the effectiveness of the cleaning up of spillage;
- (j) quantify the amount of radiation from materials and equipment released from mining and processing operations; and
- (k) the effectiveness of personnel protective equipment.

(2) The following pathways shall be quantitatively assessed at specified intervals:-

- (a) exposure to short lived Rn-222 (radon) and Th-220 (thorium) daughter products in the air
- (b) exposure to external radiation (beta-gamma dose rate);
- (c) exposure to long lived alpha emitting nuclides in air;
- (c) surface contamination levels (alpha and beta emitters) in surface works;

- (d) contaminated scrap; and
- (e) radon gas concentrations in underground workings.

Emergency Preparedness Plan

20.-(1) A holder shall submit for approval an Emergency Preparedness Plan to the Chief Inspector

(2) The Emergency Preparedness Plan shall include the following:-

- (a) the results of any accident analysis, lessons learned from operating experience and accidents that have occurred with sources of a similar type;
- (b) review and update annually;
- (c) training programme for personnel involved in implementing emergency plans and rehearsal programme for personnel in conjunction with relevant authorities;
- (d) sensitization programme to members of the public who could reasonably be expected to be affected by an accident;
- (a) any practise or source which could give rise to a need for emergency intervention;
- (b) the allocation of responsibility for notifying the relevant authorities and for initiating intervention;
- (c) intervention levels for the relevant protective actions and the scope of their application, by taking into account the possible degrees of severity of accidents or emergencies that could occur;
- (d) procedures, including communication arrangements, for contacting any relevant intervening organisation and for obtaining assistance from fire-fighting, medical, police and any other relevant organisations;
- (e) a description of the methodology and instrumentation for assessing the accident and its consequences on and off site;
- (f) a description of the public information arrangements in the event of an accident;
- (g) the criteria for the termination of each protective action;
- (h) the holder's plans to contain any radiation arising from incidents or accidents in transit and to receive back the holder's consignment;
- (i) any other relevant information that may be required.

(3) A holder shall ensure that adequate provision is made for generating sufficient information promptly and communicating it to responsible authorities with regard to-

- (a) early prediction or assessment of the extent and significance of any accidental discharge of radioactive substances to the environment;
- (b) rapid and continuous assessment of the accident as it proceeds; and
- (c) determining the need for protective actions.

(4) A holder shall ensure that sufficient financial arrangements are made, including appropriate levels of insurance, to contain any emergency situation.

PART III  
WASTE MANAGEMENT PLAN

General requirements

21. A holder shall develop a Waste Management Plan which includes proposals for radioactive waste management in relation to-

- (a) description of the mine and plant facilities and resources; (b) a description of the base line environmental conditions;
- (b) operating, environmental, geo-technical and radiation dose assessment procedures;
- (c) a description of the operation and the processes generating waste;
- (d) the chemical and physical characteristics of radioactive waste, including the quantities and rate of production;
- (e) the heritage, social and cultural matters and the proposed present and future land use;
- (f) the waste management facilities and practises, waste conditioning and containment including site, design of construction and operation;
- (g) the discharges whether in liquid, solid or gaseous form, and the receiving environment;
- (h) the discharge criteria;
- (i) the contingency plans to deal with natural events, incidents, equipment and operational failures;
- (j) a program of assessment and review of the integrity of waste containment and disposal facilities;
- (k) a de-commissioning and closure plan with regard to the final disposal of waste; and
- (l) any other relevant information that may be required.

Integration of Plans

22.-(1) Waste Management Plan shall be integrated with the Radiation Operation Management Plan and with the overall project environment

tal management plan.

(2) A holder shall submit to the Chief Inspector an updated Waste Management Plan annually.

(3) A holder shall, where there is a significant change of circumstances, submit to the Chief Inspector for approval an updated Waste Management Plan within thirty days of the changed circumstances.

(4) A holder shall, where there is a significant change in operational procedures, submit an updated de-commissioning proposal within thirty days of the changed circumstances.

(5) A holder shall prepare a quality assurance program in the Waste Management Plan which shall include:-

- (a) civil engineering and geo-technical aspects of the containment system;
- (b) the mode of operation of the system;
- (c) the scope and frequency of the monitoring systems; and
- (d) any traceability to national and international standards.

#### PART IV

#### PLAN TO TRANSPORT AND STORE RADIOACTIVE ORES AND PRODUCTS

#### Interpretation

23.-(I) In this schedule, unless the context otherwise requires-

"A<sub>1</sub>" means the activity value of a special form of radioactive material and is used to determine the activity limits for the purpose of these Regulations;

"A<sub>2</sub>"<sup>A2</sup> means the activity value of radioactive material, other than special form radioactive material and is used to determine the activity limits for the purpose of these Regulations;

"special form radioactive material" means at least one dimension not less than 5mm;

"type A packages" means packages that shall not contain activities greater than:-

- (a) for special form radioactive material, A<sub>1</sub> and
- (b) for all other radioactive material, A<sub>2</sub> ;

"type B(M) packages" means packages which shall not contain-

- (a) activities greater than those authorised for the package design;



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- (b) radionuclides different from those authorised for the package design; and
- (c) contents in a form, or a physical or chemical state, different from those authorised for the package design, and specified in their certificates of approval;

"type C packages" means packages that shall not contain-

- (a) activities greater than those authorised for the package design;
- (b) radionuclides different from those authorised for the package design; and
- (c) contents in a form, or a physical or chemical state, different from those authorised for the package design; and specified in their certificates of approval.

Transportation and storage of radioactive minerals

24. Prior to the transportation, storage, acquisition or exportation of radioactive mineral substances, a person shall obtain a permit from the Commission as provided for under these Regulations.

Packaging requirements before shipping

25.-(1) A holder shall, before shipment, submit to the Chief Inspector for approval a copy to TAEC the design and technical specifications of any package or drum.

(2) A holder shall, for any system with a gauge pressure exceeding 35 kPa, ensure that the containment system of a package conforms to the approved design requirements relating to the capacity of the system to maintain its integrity under pressure.

(3) Where neutron poisons are included as components of any package containing fissile material, the holder shall confirm the presence and distribution of the neutron poisons.

General Requirements for packages

26. The design of a package shall conform to the following:-

- (a) the mass, volume and shape of the package which render it easy and safe to transport;
- (b) the exposure levels from the package within legally prescribed limits;
- (c) lifting attachments on the package which shall not fail when used in the intended manner and the design by taking into account appropriate safety factors to cover snatch lifting;
- (d) lifting attachments which is removable or otherwise rendered incapable of being used during transportation;
- (e) as far as practicable the outer layer of the package be designed so as to prevent the collection and the retention of water;

- (f) any features added to the package at the time of transportation which are not part of the package which shall not reduce its safety;
- (g) the package to be capable of withstanding the effects of any acceleration, vibration or vibration resonance which may arise under the routine conditions of the United Nations Recommendations on the Transport of Dangerous Goods, for Packaging Group I or II. and if they were subjected to the tests prescribed in that document, but with the drop test conducted in the most damaging orientation, they would prevent-
  - (i) loss or dispersal of the radioactive contents; and
  - (ii) loss of shielding integrity which would result in more than a twenty percent increase in the radiation level at any external surface of the intermediate bulk container

Approval and administrative requirements

27.-(1) A consignor shall, where it is not necessary to obtain an approval certificate for the package designs, on request, make available for inspection by the relevant competent authority, documentary evidence of the compliance of the package design with all the applicable requirements.

(2) An application for approval shall include-

- (a) a detailed description of the proposed radioactive contents with reference to their physical and chemical status and the nature of the radiation emission;
- (b) detailed statement of the design, including complete engineering drawings and schedule of materials and methods of construction;
- (c) a statement of the tests which have been done and their results, or evidence based on calculative methods or other evidence that the design is adequate to meet the applicable requirements;
- (d) the proposed operating and maintenance instructions for the use of the packaging;
- (e) if the package is designed to have a maximum normal operating pressure in excess of one hundred kPa gauge, a specification of the materials of manufacture of the containment system, the samples to be taken, and the tests to be made;
- (f) any special storage provisions necessary to ensure the safe dissipation of heat from the package considering the various modes of transport to be used and type of conveyance or freight container:

## *Mining (Radioactive Minerals) Regulations*

*GN. No. 4 (contd...)*

(g) a reproducible illustration, not larger than 2 I cm by 30 cm, show in the make-up of the package; and

(h) a specification of the applicable quality assurance programme as required

(3) The competent authority shall establish whether an approved design meets the requirements for Type n (U) or Type C packages and shall attribute an identification mark to the design

Notification and registration of serial numbers

28.-(1) A holder shall, inform the competent authority, of the serial number of each package manufactured to an approved design.

(2) A holder and the competent authority shall maintain a register of the serial numbers referred to under sub-paragraph (1).

Approval of shipments

29. Multilateral approval shall be required for-

(a) the shipment of Type B (M) packages not conforming to the requirements designed to allow controlled intermittent venting;

(b) the shipment of Type B (M) packages containing radioactive material with an activity greater than 3000 A 1 or 3000 A2• as appropriate, or I 000 TBq, whichever is the lower; and

(c) radiation protection programmes for shipments by special use vehicles according to the requirements.

(2) A competent authority may authorise transport into or through its country without shipment approval, by a specific provision in its design approval.

(3) An application for shipment shall include-

(a) in relation to the shipment, the period of time for which the approval is sought;

(b) the actual radioactive contents, the expected modes of transport, the type of conveyance and the probable or proposed route;

(c) the details of how the precautions and administrative or operational controls referred to in the package design approval certificates issued are to be put into effect.

Transportation of Radioactive Minerals

30. A holder shall be liable for the radioactive mineral commodity on transit until the consignee receives it.

(2) A holder shall:-

(2) A holder shall-

- (a) establish a radiation protection program for the transport of radioactive minerals which shall be made available for inspection by the relevant competent authority;
- (b) ensure that the nature and extent of the measures to be employed in the radiation protection programs are related to the magnitude and likelihood of radiation exposures;
- (c) ensure that the protection and safety measures are optimised in order that the magnitude of individual doses, the number of persons exposed and the likelihood of incurring exposure are kept as low as reasonably achievable; and
- (d) ensure that the workers receive appropriate training in radiation hazards and the precautions are observed in order to ensure restriction of their exposure and other persons who might be affected by their action.

(3) The holder shall ensure the following during the transportation of radioactive minerals:-

- (a) correct labeling, packaging and loading of the mineral commodity;
- (b) regular contact with transporter until the mineral commodity is delivered to the consignee;
- (c) any vehicle transporting radioactive minerals, shall not be parked in any public place;
- (d) where an accident occurs during transportation, a radiation protection officer appointed in accordance with Regulation 20 shall:
  - (i) ensure that the scene of the accident is cordoned off;
  - (ii) immediately inform the Chief inspector, TAEC and NEMC; and
  - (iii) take necessary steps and measures to prevent the exposure of the public to ionising radiation and minimise the contamination of the surrounding environment;
- (e) a transporting vehicle shall have the emergency contact telephone numbers of the Ministry of Energy and Minerals, TAEC, NEMC on either side of the vehicle; and
- (f) in the case of air transportation, within Tanzania, the Civil Aviation Act, shall apply in addition to the provisions of these Regulations.

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Occupation health and safety in transportation

31.-(1) A holder shall conduct periodical assessments of the radiation doses to a person arising from the transportation of radioactive minerals, to ensure that the system of protection and

safety complies with the basic safety standards.

(2) Where Chief Inspector, in the case of occupational exposures arising from the transportation activities, assesses that the effective dose:-

- (a) is unlikely to exceed 1 mSv in a year, shall not require any special work patterns, detailed monitoring, dose assessment programmes or individual record keeping; and
  - (b) is likely to be between 1 and 6 mSv in a year, shall conduct a dose assessment programme through work place monitoring or Individual monitoring;
  - (c) is likely to exceed 6 mSv in a year, shall conduct individual monitoring;
- (3) A holder shall, where the ChiefInspector conducts individual monitoring or work place monitoring, keep appropriate records.

Emergency response during transportation

32.-(1) A holder shall in the event of an accident or an incident during the transportation of radioactive minerals, observe and implement emergency provisions to protect persons, property and the environment.

(2) The Emergency procedures taken under sub-paragraph (1), shall take into account the formation of other dangerous substances that may result from the reaction between the contents of the consignment and the environment in the event of an accident.

Special arrangements or exemptions

33.-(1) The consignments for which conformity with other provisions of these Regulations is impracticable shall not be transported except under special arrangements approved by the Commission.

(2) The Commission may approve special arrangement transport operations for a single or a planned series of multiple consigners, where the competent authority is satisfied that conformity with other provisions of these Regulations is impracticable and that the requisite standards of safety established by these Regulations have been demonstrated by a holder.

(3) The overall level of safety in transport shall be equivalent to that which would be provided if all applicable requirements met in the case of international consignments multilateral approval shall be required in accordance with paragraph 7 of this Schedule.

Storage of radioactive

34.-(1) Radioactive minerals shall be segregated sufficiently

minerals

from workers and from members of the public.

(2) The following values for dose rates shall be used for the purpose of calculating segregation distances or radiation levels:-

- (a) in the case of workers in regularly working areas, a dose of 5 mSv in a year; and
- (b) in the case of members of the public, in areas where the public regular access, a dose of 1 mSv in a year to this public group.

(3) Radioactive materials shall be sufficiently segregated from undeveloped photographic film.

(4) The basis for determining segregation distances for any purpose under subparagraph (3) shall be the radiation exposure of undeveloped photograph film due the transportation of radioactive material be limited to 0.1mSv per consignment of film.

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SECOND SCHEDULE

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*(Made under Regulations 4, 16(1) and 18(2))*

QUANTITATIVE RADIOLOGICAL HAZARD AND SAFETY ASSESSMENT FOR THE PROSPECTING, MINING AND PROCESSING OPERATIONS

General requirements

1.-(1) A holder shall conduct a quantitative radiological hazard and safety assessment of the operations and activities involving radioactive minerals.

(2) A radiological hazard and safety assessment shall-

- (a) identify all potential radiological hazards associated with prospecting, mining and processing of radioactive minerals;
- (b) assess the effectiveness of engineering and operational controls; and
- (c) determine the magnitude of radiological hazards from both normal operations and accidents to workers and the members of the public.

## *Mining (Radioactive Minerals) Regulations*

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*GN. No. 4 (contd...)*

Radiological safety assessment                      2.-(1) A holder shall assess all aspects involving radioactive minerals from the prospecting, mining and processing of ores, to the storage and transportation of final products and waste.

(2) A holder shall, in an assessment-

- (a) identify and quantify the prevailing levels of the different radiological hazards;
- (b) identify the areas where the potential for radiation exposure of workers may result in an effective dose exceeding 1 mSv per year;
- (c) identify any individual who may be occupationally exposed to ionising radiation and receive an annual effective dose in excess of 20 mSv;
- (d) determine the potential for radiation exposure of the members of the public due to airborne and liquid effluent releases from the site and the disposal of radioactive waste;
- (e) assess the efficiency and effectiveness of the engineered and operational controls; and
- (f) estimate the magnitude of the risks resulting from accidents whether on or off site.

Radiological hazard assessment                      3.-(1) A radiological hazard assessment shall:-

- (a) identify the various types of radioactive materials present in the whole process and determine their physical and chemical form, nuclide composition, activity concentrations and estimate total quantities to be mined and processed per annum;
- (b) identify and quantify the radiological doses to workers and members of the public associated with the activities involving radioactive materials;
- (c) quantify the mean levels and variations of the radiological hazards during full working shifts and determine the magnitude of longer term fluctuation ;
- (d) identify individuals occupationally exposed to radiological hazards;
- (e) quantify the degree of individual occupational exposure in terms of the annual dose equivalent received from all radiation exposure pathways for routine, maintenance and repair operations;
- (f) quantify the impact of radioactive emissions from the site in terms of the annual effective dose received by the public in all potentially affected areas; and
- (g) quantify and control the hazard associated with equipment leaving site.

(2) The following exposure pathways shall be

quantitatively assessed at specific locations:-

- (a) exposure to short lived Rn-222 (radon) and Th-220 (thorium) daughter products in air;
- (b) exposure to external radiation (beta-gamma dose rate);
- (c) exposure to long lived alpha emitting nuclides in air;
- (d) surface contamination levels (alpha and beta emitters) in surface works;
- (e) contamination of scrap; and
- (f) radon gas concentrations underground mining operations

Obligations of holder 4.-(1)A holder shall determine:-

- (a) the amount of airborne radioactivity and terrestrial radiation emitted by the following facilities-
  - (i) tailings dumps;
  - (ii) waste rock dumps;
  - (iii) open pits or underground mine workings;
  - (iv) plant infrastructure;
  - (v) workshop infrastructure;
  - (vi) office infrastructure; and
  - (vii) any other infrastructure.
- (b) the amount of radiation emitted from water ponds;
- (c) the amount of radiation emitted from contaminated equipment and waste materials;
- (d) the amount of radon emissions from tailings and waste rock dumps;
- (e) the amount and distribution pattern for the dust dispersed from tailings and waste rock dumps. with particular attention to nearby human settlements;
- (f) the amount of radioactive contamination in seepage and run-off water from tailings and waste rock dumps;
- (g) the structure, geo-technical and seismic stability of tailings and waste rock dumps; and
- (h) the amount of radiation emitted from any other source that is part of a mine or plant infrastructure.

(2) A holder shall, before the termination of any obligations relating to any closed waste management facility, submit to the Commission, TAEC and NEMC the results of the final radiological and environmental survey and a closure completion report .in order to document compliance with the regulatory requirements for managing waste.

(3) The information required under sub-paragraph (2) shall be determined as accurately as practicable and shall be included in the



de-commissioning and closure plan.

(4) The objectives of a de-commissioning and closure plan shall include but not be limited to:-

- (a) achieving long-term radiation protection by reducing the effective equivalent dose to the individual in the critical public group to below 0.1 mSv per annum;
- (b) achieving background water quality in the long-term by controlling groundwater contamination;
- (c) reducing the residual concentration of radioactive elements by undertaking soil clean-up operations;
- (d) reducing the radon flux over the surface of the final tailings dumps to an internationally acceptable rate of 20pCi/m<sup>2</sup>
- (e) rehabilitation of tailings dumps and to make them stable for at least two hundred years;
- (f) minimising hazards to the public and the environment;
- (g) preventing inadvertent human intrusion and dispersion of contaminated materials by wind and water erosion;
- (h) complying with other applicable and relevant regulations governing air, and water quality in non-radiological aspects; and
- (i) decontaminating and safely disposing of equipment and waste materials.

Radioactive mines and plants abandonment

5. A holder shall, on an application for abandonment of a mine or plant, submit-

- (a) a report on the Status of the environment at abandonment Stage;
- (b) the rehabilitation objectives and performance indicators for all components and phases;
- (c) the methods for monitoring the remediation work program objectives;
- (d) the methods to de-contaminate equipment to be removed from the project site;
- (e) the proposed methods of disposing of unsold equipment which is not decontaminated;
- (f) the plans and sections of the entire mine or plant site showing the location of major infrastructure such as plants
- (g) the estimated time period between project closure and abandonment;
- (h) a comprehensive statement accompanied by plans, assessment of alternative rehabilitation methods with cost and levels of radioactivity after rehabilitation and the

	proposed post closure land uses;
	(i) the proposed methods aimed at rehabilitating the site to other beneficial land uses; and
	(j) a closure certificate granted by the Chief Inspector.
	(k)
Compliance with Treaty Provisions	6.-(1) A holder shall, in the programme of mining operations, outline proposal to comply with the articles of the Nuclear Non-Proliferation Treaty to which Tanzania is a signatory.
	(2) A holder shall develop and employ appropriate safeguards in accordance with the International Atomic Energy Agency (IAEA), to ensure the fulfillment of obligations assumed under the Nuclear Non-Proliferation Treaty to prevent diversion of nuclear energy materials from peaceful uses to nuclear weapons or other intermediate nuclear weaponry devices.
Obligations of Holder	7. A holder shall communicate the safeguards referred to under paragraph 1 prior to the commencement of operations and report on compliance at every shipment to the competent authority.
	(2) A holder shall, in addition to the requirements stipulated under sub-paragraph (1):-
	(a) outline the implementation procedures for the safeguards with respect to source or special fissionable material at their mine, storage or processing facility;
	(b) undertake to prevent provision for nuclear material other fissionable material equipment or material specifically designed for the processing, use or production of special fissionable material, to any Nuclear Non-Nuclear Weapons State or individuals or institutions whether in a Nuclear Weapons State or not; and
	(c) outline how the proposed safeguards shall assist the holder to comply with Article IV of the Nuclear Non-Proliferation Treaty and encourage peaceful and economic use and exchange of nuclear energy material.
	(3) A holder shall outline marketing proposals of radioactive minerals within or outside the United Republic of Tanzania so as to comply with all aspects of the Nuclear Non-Proliferation Treaty.
	(4) A holder shall comply with the marketing plan submitted in an application for acquisition, selling or exporting of radioactive minerals and the holder shall report on the marketing activities to the Commission and any other relevant authority.

*Mining (Radioactive Minerals) Regulations*

*GN. No. 4 (contd...)*

THIRD SCHEDULE

*(Made under Regulation 5(2))*

FEEES FOR DEALING IN RADIOACTIVE MINERALS

		TSHS US\$
	Application fees for export or import permit of radioactive minerals	Shs. 50,000/=
2	Import or export permit of radioactive mineral	Shs. 100,000/=
3	Application fees for acquiring or transportation of radioactive minerals	Shs. 50,000/=
4	Permit to acquire or transport radioactive minerals	Shs. 100,000/=

FOURTH SCHEDULE

FORM NO. 1

THE MINING ACT, CAP.123

*(Made under Regulation 6(2))*

APPLICATION FOR PERMIT TO TRANSPORT RADIOACTIVE MINERALS

1. Full name of applicant minerals(in block letter).....
2. Full address.....
3. Purpose for which radioactive minerals are required .....
4. Name and address of supplier .....
5. State the licence for acquiring radioactive minerals.....
6. State validity of licence .....
7. State type of radioactive minerals.....
8. State quantity of radioactive minerals.....
9. State nature of radioactive minerals.....
10. State route of radioactive minerals.....
11. State route to be followed .....
12. State means of transport.....
13. State nature of packaging.....
14. Place and administrative districts where live minerals will be stored.....

Name of applicant..... Signature of applicant

Title.....

Date.....

Official stamp

*Mining (Radioactive Minerals) Regulations*

*GN. No. 4 (contd...)*

FORM NO.2

THE MINING ACT, CAP.123

*(Made under section 108)*

PERMIT TO TRANSPORT RADIOACTIVE MINERALS

Permission is hereby granted to (full name).....holder of Licence  
No..... of (full address).....  
..... to transport  
package(s) containing..... (type) with a total weight.....(et weight) with a  
total value of.....[US\$]

The said minerals will be transported by.....(state means of transportation from  
.....[mining place at which the Radioactive Minerals are to be taken] to  
..... [place and address where minerals will be stored or shipped  
.....

This permit is valid for a period of ..... days from the date hereof.

This permit is issued subject to the following condition(s).....  
.....  
.....  
.....

Dated at ..... this ..... day of ..... 20.....

.....  
EXECUTIVE SECRETARY

MINNING COMMISSION

*Mining (Radioactive Minerals) Regulations*

*GN. No. 4 (contd...)*

THE MINING ACT, CAP.123

*(Made under section 108)*

FORM NO. 3

CERTIFICATE OF EXPORTATION FOR RADIOACTIVE MINERALS

Permission is hereby granted to [full name].....  
 .....  
 .....[The name and address of importer/consignee is] holder of  
 licence No.....of [full address]  
 .....  
 to import..... package(s) containing radioactive minerals weighing.....  
 Pounds/Kilograms with a total value of US dollar (USD).....[Value declared by the  
 importer as being US\$]. The radioactive minerals were mined in ..... [country where  
 extracted]. Types of radioactive minerals are shown hereunder:-

S/N	Type	Weight (Lb/Kg.)	Value (US\$)
1			
2			
2			
	TOTAL		

The radioactive minerals shall be imported at [state name of Customs station at which entry is to be made) ..... on or before [state date]  
 .....otherwise this permit shall be null and void.

The name and address of exporter is.....  
 .....

For completion by Customs.

The radioactive minerals to which this permit refers were imported by [full name and address of importer]  
 .....

from..... at [place of entry]..... on  
 [date]..... 20.....

.....  
*Collection of Customs*

*Mining (Radioactive Minerals) Regulations*

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*GN. No. 4 (contd...)*

NOTE: This permit must be submitted to a collector of customs at the time of the importation of the radioactive minerals to which it relates for confirmation by the Commission.

The permit is issued subject to the following condition(s):-

Dated at ..... this day of ..... 20 .....

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EXECUTIVE SECRETARY

Dar es Salaam  
9<sup>th</sup> January, 2018

ANGELLAH J. M. KAIRUKI,  
*Minister for Minerals*