

NUCLEAR SAFETY AND RADIATION PROTECTION ACT

(1995 No. 19)

NIGERIAN RADIOACTIVE WASTE MANAGEMENT REGULATIONS, 2006



ARRANGEMENT OF REGULATIONS

REGULATION

PART I—GENERAL

1. Interpretation.
2. Objective.
3. Scope.
4. Application.
5. Radioactive waste classification.

PART II—RESPONSIBILITIES AND ADMINISTRATIVE MEASURES

6. Responsibilities.
7. Licence applications.
8. Radioactive Waste Co-ordinator.
9. Return of sealed radioactive source to supplier.
6. Responsibilities.
7. Licence applications.
8. Radioactive Waste Co-ordinator.
9. Return of sealed radioactive source to supplier.
10. Transfer of spent sealed source to another authorized user.
11. Prohibition of importation of radioactive waste.
12. Public involvement.
13. Licence for manufacture, import and distribution of consumer products containing radioactive substance.

PART III—WASTE MANAGEMENT OPERATIONS

14. Segregation, collection and characterization.
15. Container labelling.
16. Discharge of radioactive substances to the environment.
17. Discharge record and report.
18. Discharge of exempt waste.
19. Release of specific waste.
20. Waste storage.
21. Preparation for transportation of waste.
22. Transportation.
23. Treatment.
24. Conditioning.

- 25. Disposal of radioactive waste.
- 26. Quality Assurance.
- 27. Physical protection.

PART IV—REPORTING TO THE AUTHORITY

- 28. Reporting to the Authority

entry and inspection.
and penalties.

- 31. Right of
- 32. Offences
- 33. Appeals.
- 34. Citation.

SCHEDULES

SCHEDULE 1

WASTE CLEARANCE

SCHEDULE 2

LIMITS OF ALUMINUM FOR CERTAIN COMMON RADIONUCLIDES

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[5th October, 2006]

Commence-
ment.

In exercise of the powers conferred on it by Section 47 of the Nuclear Safety and Radiation Protection Act 1995 and of all other powers enabling it in that behalf, THE NIGERIAN NUCLEAR REGULATORY AUTHORITY, with the approval of the President, hereby makes the following Regulations :

PART I—GENERAL

1. In these Regulations, unless the context indicates otherwise :

Interpre-
tation.

“*The Act*” means the Nuclear Safety and Radiation Protection Act 1995 ;

“*The Authority*” means the Nigerian Nuclear Regulatory Authority established under Section 1 of the Act ;

“*Annual Limit on Intake*” (ALI) means the intake of a given radionuclide in a year by reference which would result in a committed dose equal to the relevant dose limit. The ALI is expressed in units of activity. (According to NIBIRR an effective dose of 20 mSv shall not be exceeded for occupationally exposed workers and of 1 mSv for members of the public) ;

“*Authorization*” means permission granted in a document by the Authority to a legal person who has submitted an application to possess, produce, process, manufacture, purchase, sell, import, export, handle, use, transform, transfer, trade, assign, transport, store or dispose of radioactive material, nuclear material, radioactive waste, prescribed substances or any apparatus emitting ionizing radiation and the authorization may take the form of a registration or a licence ;

“*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 Authority and expressed in terms of activity concentrations and 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 or disposal and shall include the conversion of waste to a solid waste form, enclosure of the waste in containers and if necessary, providing an over pack ;

“*Consumer Product*” means an appliance or device, produced, made, manufactured, refined or improved in which a small amount of radioactive substance

has been deliberately incorporated or induced, and which can be supplied to members of the public ;

“*Container*” means the vessel into which the waste form is placed for handling, transportation, storage and eventual disposal. The waste container is a component of the waste package ;

“*Critical Group*” means a group of persons which is reasonably homogeneous and susceptible to exposure to a given radiation source and exposure pathway which includes the group of persons receiving the highest effective dose or equivalent dose, as applicable by the given exposure pathway from the given source ;

“*Designated Radioactive Waste Management Facilities*” (DRWMF) means facilities for collection and transportation of all radioactive waste from the waste generator’s establishments 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 ;

“*Disposal*” means the placement of waste in an approved, specified facility including near surface or geological repository without the intention of retrieval and includes the approved direct discharge of airborne or liquid effluents into the environment with subsequent dispersion ;

“*Dose Rate*” means in relation to a place, the rate at which a person or part of a person would receive a dose of ionizing radiation from external radiation, if he were at that place being a dose rate at that place averaged over one minute ;

“*Effective Dose*” means the quantity E, defined as a summation of the tissue equivalent doses, each multiplied by the appropriate tissue Weighting factor :

$$E = \sum_T W_T H_T$$

Where H_T is the equivalent dose in tissue T and W_T is the tissue weighting factor for tissue T. From the definition of equivalent dose, it follows that :

$$E = \sum_T W_T \cdot \sum_R W_R \cdot D_{T,R}$$

Where W_R is the radiation weighting factor for radiation R and $D_{T,R}$ the average absorbed dose in the organ or tissue T. The unit of effective dose is $J \cdot kg^{-1}$, termed the Sievert (Sv) ;

“*Exempt Waste*” means any waste that is released from regulatory control in accordance with clearance levels because the associated radiological hazards are negligible. The designation should be in terms of activity concentration and total

activity and may include a specification of the type, chemical or physical form, mass or volume of waste, and its potential use ;

“Ionizing Radiation” means energy in the form of particles or electromagnetic waves of a wavelength of 100 nanometers or less or a frequency of 3×10^{15} hertz or more capable of producing ions directly or indirectly ;

“Legal Person” means any organization, corporation, partnerships, firm, association, trust, estate, public or private institution, group, political or administrative entity or other persons designated in accordance with the Act, who or which has responsibility and authority for actions taken under these regulations ;

“Licence” means an authorization granted by the Authority on the basis of a safety assessment and accompanied by specific requirements and conditions to be complied with by the licensee ;

“Licensee” means a person granted an authorization by the Authority on the basis safety assessment and complied with specific requirements and conditions ;

“Limit” means the value of a quantity used in certain specified activities or circumstances that must not be exceeded ;

“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 or non-continuous ;

“NiBIRR” means Nigeria Basic Ionizing Radiation Regulations, 2003 ;

“Notification” means a document submitted to the Authority by a legal person to notify an intention to carry out a practice or any other action described in the general obligations for practices ;

“Practice” means work involving

(a) the production, processing, handling, use, holding, storage, transport or disposal of radioactive substances ; or

(b) the operation of any electrical equipment emitting ionizing radiation and containing components operating at a potential difference of more than 5 kilovolts,

which can increase the exposure of individuals to radiation from an artificial source, or from a radioactive substance containing naturally occurring radionuclides, which are processed for their radioactive, fissile or fertile properties ;

“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 licence ;

“Radiation Accident” means an accident where immediate action would be required to prevent or reduce the exposure to ionizing radiation to employees, the environment or any other persons ;

“*Radioactive Discharges*” means radioactive substances discharged as gases, aerosols, liquids or solids to the environment, from a source within any activity generally with the purpose of dilution and dispersion ;

“*Radioactive Substance*” means any substance, which contains one or more radionuclides whose activity cannot be disregarded for the purposes of radiation protection ;

“*Radioactive Waste*” means material, whatever its physical form, remaining from practices or interventions and for which no further use is foreseen :

(a) that contains or is contaminated with radioactive substances and has an activity or activity concentration higher than the level for exemption or clearance from regulatory requirements, and

(b) exposure which is not excluded from these regulations ;

“*Radioactive Waste Management Fund*” means the fund established by government with contributions from waste generator to make provisions for long-term management options of the various waste forms ;

“*Radionuclide*” means a nucleus (of an atom) that possesses properties of spontaneous disintegration (radioactivity). Nucleus are distinguished by their mass and atomic number ;

“*Regulatory Control*” means any form of control applied to facilities or activities by the Authority for reasons related to radiation protection or the safety or security of radioactive sources ;

“*Repository*” means a nuclear facility where waste is placed for disposal and future retrieval of waste from the repository is not intended ;

“*Safety*” means measures intended to minimise the likelihood of accidents with radioactive sources and, should such an accident occur, to mitigate its consequences ;

“*Safety Assessment*” means a review of the aspects of design and operation of a source which are relevant to the protection of persons, environment or the safety of the source, including the analysis of the provisions for safety and protection established in the design, operation of the source, the analysis of risks associated with normal conditions and accident situations ;

“*Sealed Source*” means a source containing any radioactive substance whose structure is such as to prevent, under normal conditions of use, any dispersion of radioactive substances into the environment, but it does not include any radioactive substance inside a nuclear reactor or any nuclear fuel element ;

“*Security*” means measures to prevent unauthorized access or damage to, loss, theft or unauthorized transfer of radioactive sources ;

“*Storage*” means the placement of radioactive waste in a suitable facility where isolation, environmental protection and human control (e.g. monitoring) are provided with the intent that the waste will be retrieved for clearance, treatment, conditioning and disposal at a later time.

“*Transport*” means, in relation to radioactive substances, carriage by road or through any public place whether on a conveyance or not, by rail, inland waterway, sea or air. In the case of transport on a conveyance, a substance shall be deemed as being transported from the time that it is loaded onto the conveyance for the purpose of transporting it until it is unloaded from that conveyance, but a substance will not be considered as being transported if—

(a) it is transported by means of a pipeline or similar means ; or

(b) it forms an integral part of a conveyance and is used in connection with the operation of that conveyance ;

“*Treatment*” means the operations intended to benefit safety and economy by changing the characteristics of waste. Three basic treatment objectives are :

(a) volume reduction ;

(b) removal of radionuclides from the waste ;

(c) change of composition,

after treatment, the waste may or may not be immobilised to achieve an appropriate waste form.

“*Waste Inventory*” means a detailed, itemised record maintained by the operator or Authority in accordance with these regulations, and may contain data such as physical quantity, the activity of the waste, the radionuclide content, and other characteristics.

“*Waste Generator*” means any person or organization engaged in activities which generate radioactive waste.

“*Waste Management*” means all activities, administrative and operational, that are involved in the handling, treatment, conditioning, storage, disposal and transportation of waste.

“*Waste Package*” means the product of conditioning that includes the waste form and any container(s) and internal barriers (e.g. absorbing materials and liner) 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 a component of waste package.

2. These Regulations 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 Nigeria’s borders. Objective.

3.—(1) The scope of these Regulations covers the requirements associated with such steps in waste management as collection, segregation, characterisation, treatment, conditioning, storage and preparation for transport of radioactive waste arising from medical, industrial and research facilities where radioactive materials and sources of ionizing radiation are produced, used or handled. Scope.

(2) These regulations shall not apply to Technologically Enhanced Naturally Occurring Radioactive Materials (TE-NORM).

Application.

4.—(1) The application of these Regulations shall be in addition to the Nigeria Basic Ionizing Radiation Regulations 2003 (NiBIRR) and the Nigeria Technologically Enhanced Naturally Occurring Radioactive Materials Regulations and any other existing ionizing radiation and nuclear regulations as well as any transport regulations in force.

(2) These Regulations shall apply to :

(a) all solid, liquid and gaseous waste with activity levels above the clearance levels specified in Schedule I ;

(b) all users of sources of ionizing radiation in medicine, industry, teaching, research, agriculture, hydrology, geology and other field of human activity whenever such uses are subject to registration or licensing under these Radioactive Waste Management Regulations ; and

(c) operators of radioactive waste management facilities.

Radioactive waste classification.

5. Radioactive waste shall be classified using the following categories :

(a) according to its physical form and composition :

(i) solid waste,

(ii) liquid aqueous waste,

(iii) liquid organic waste,

(iv) gaseous waste,

(v) sealed radioactive sources,

(vi) biological waste (e.g. animal carcasses which might undergo decomposition if not properly treated and stored), and

(vii) medical waste (e.g. syringes, bed linen and contaminated clothing from a hospital environment) ;

(b) according to the activity concentration and half lives of radionuclides contained in the following category of radioactive waste :

Category I— Low level radioactive waste (e.g. the activity is less than 10 MBq), containing short lived 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.

Category II—Low and intermediate level radioactive waste, containing the radionuclides with half life <30 y 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 alpha emitting radionuclides to 400 Bq/g individual waste packages and to an overall average of 400 Bq/g per waste package).

Category III—Low and intermediate level radioactive waste, containing the radionuclides with half life >30 y, and concentration of alpha emitters exceeding the limitations for Category II. This waste needs to be disposed of in deep geologic facilities only.

Category IV—High level radioactive waste, with thermal power above 2 kW/m³ and concentration of alpha emitters exceeding the limitations for Category II (e.g. spent-fuel from research reactors). This waste needs to be disposed of in deep geologic facilities only.

PART II—RESPONSIBILITIES AND ADMINISTRATIVE MEASURES

6.—(1) Primary responsibility for the safe management of radioactive waste rests with the waste generator who shall take all necessary actions to ensure the safety of radioactive waste unless the responsibility has been transferred to another person or organization as approved by the Authority.

Responsi-
bilities.

(2) The Authority is responsible for enforcement of compliance of the provisions of these Regulations and all other relevant requirements by waste generators and the operators of Designated Radioactive Waste Management Facilities as established under these Regulations and the implementation of the licensing process for generation and management of radioactive waste.

(3) The waste generator shall be responsible for on-site segregation, collection, characterisation and temporary storage of the radioactive waste arising from his activities and discharge of exempt waste.

(4) All radioactive waste that are not expected to decay to clearance levels within one year from the time of its generation shall be transferred from the waste generator to the Designated Radioactive Waste Management Facilities.

(5) Designated Radioactive Waste Management Facilities shall have the responsibility to discharge exempt waste and to store conditioned radioactive waste until a disposal facility is established and becomes operational and the waste has been disposed of, or the waste has been transported abroad for further processing and disposal.

(6) No person or organization shall dispose of any radioactive waste unless the disposal facility designed and constructed specifically for this purpose is available and licenced.

(7) The Authority shall be responsible for :

(a) management of radioactive waste where the person that generates the waste is incapable of appropriate management of the waste either through—

(i) bankruptcy, or

(ii) revocation of licence, or

(iii) non existence of waste generator, or

(iv) as may be appropriately determined ; and

(b) recovering of the costs incurred from those responsible, where they are identified.

