KENYA STANDARD

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ICS 13.280

Corpses containing radioactive materials — Safe handling — Code of practice

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TECHNICAL COMMITTEE REPRESENTATION

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Kenya Airways- Non Destructive Testing Department
Kenya Industrial Research and Development Institute- Energy Division
Kenya National Accreditation Service
Kenyatta National Hospital-Radiation Safety Department
Kenya Nuclear Electricity Board
Kenyatta University- Department of Applied Physics
Ministry of Roads and Public Works — Materials Testing and Research Department
National Commission for Science, Technology and Innovation
Non Destructive Testing Society of Kenya
Radiation Protection Board
SGS limited Kenya
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REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya standards shall be regularly reviewed. Suggestions for improvement to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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Foreword

This Kenya Standard was prepared by the Dosimetry, Radiotracer and Non-destructive Metrology Technical Committee under the guidance of the Metrology Industry Standards Committee and it is in accordance with the procedures of the Bureau.

In the preparation of this standard, the following documents were referred to:

Recommendations for limiting exposure to ionizing radiation (1995) Guidance note [NOHSC:3022(1995)]

National standard for limiting occupational exposure to ionizing radiation [NOHSC:1013 (1995)]

RPS 14, Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2008), Radiation Protection Series

The Radiation Protection Act, Cap. 243, of the Laws of Kenya.

Acknowledgement is hereby made for the assistance derived from these sources.

Corpses containing radioactive materials — Safe handling — Code of practice

1 Scope

1.1 The Code is intended as a guide to the safe handling of the bodies of persons who have died while undergoing treatment with radioactive substances, whether sealed or unsealed, and which still retain, in or on the body, significant amounts of radioactivity. Such corpses may act as sources of ionizing radiations to which pathologists and others attending them may unknowingly be exposed. As ionizing radiations may cause adverse biological effects in those exposed to them it is desirable to keep such exposure to a minimum.

1.2 It is recommended that radiation safety officers in hospitals and other relevant institutions prepare their own detailed administrative procedures (based on this and related codes) and have them issued as instructions to the appropriate staff.

1.3 The words “shall” and “should”, where used in this Code of practice, have specialized meanings. “Shall” indicates that the particular requirement is essential for adequate protection against radiation. “Should” indicates a procedure or precaution that is to apply, wherever possible, in the interests of improving radiation protection.

2 Possible sources of exposure to ionizing radiation

2.1 Radioactive materials may be used as sealed sources, temporarily or permanently embedded in the soft tissue or cavities of the body, or they may be administered to the patient as liquids by oral, intravenous or intracavitary routes. In the case of sealed sources, they may be removed at any time, and upon such removal the patient is no longer a source of radiation.

2.2 Of the radioactive materials used in medical practice only two are naturally occurring elements; the remainders consist of artificially produced radionuclides. The naturally occurring elements are radium-226 and radon-222 in radioactive equilibrium with their decay products. Their use is rapidly declining and indeed radium-226 is rarely used now. The radionuclides most commonly used are cobalt-60, caesium-137, gold-198, iodine-125, iodine-131, iridium-192, phosphorus-32, tantalum-182 and yttrium-90. Cobalt-60, caesium-137, iodine-125, tantalum-182 and iridium-192 are used only as sealed sources. Gold-198 and yttrium-90 may be used in sealed sources (as gold grains for permanent implantation in the tissues) or in colloidal form (for treatment by injection). Iodine-131 and phosphorus-32 are administered to the patient only as solutions.

2.3 A few “Nuclear Battery” powered cardiac pacemakers are still in operation as implants. They are designed to withstand cremation furnace temperatures, and do not present any external radiation hazards. If known to have been implanted, such devices should be removed and the appropriate Regulatory Authority consulted for disposal advice.

2.4 Radioactive materials administered by oral, intravenous or intracavitary routes may become distributed throughout the body or may be selectively held in specific organs. The degree of possible hazard presented by the patient reduces with the lapse of time from the time of administration of the radioactive material. This reduction arises partly from the normal decay of the radioactivity of the material used and partly from the excretion of the material from the body.

2.5 A patient who had received the very small amounts of radioactive materials used for diagnostic or tracer tests presents no hazard to anyone called upon to attend the corpse and is not considered further in this Code.

3 General principles of protection against ionizing radiation

3.1 Exposure of individuals to radiations emitted by radioactive materials retained in or on a corpse can be reduced by adopting any or all of the following precautions:

3.1.1 Removing the radioactive materials as soon as possible. (See 4.2, 4.6.1 and 4.6.3.)

3.1.2 Working expeditiously to reduce the time of exposure.

3.1.3 Working at a distance from radioactive material rather than working unnecessarily close to it.

3.1.4 Working, where necessary, behind adequate shielding.

4 Procedures and precautions in the event of death of a patient being treated with radioactive materials

4.1 Should a patient die during treatment with radioactive materials, the specialist medical officer concerned shall be responsible for ensuring, after consultation with the radiation safety officer, that exposure to radiation of any persons handling the body is minimized.

4.2 Any sealed radioactive sources, other than permanent implants, must be removed by a competent person and accounted for before any further action is taken.

4.3 The radiation safety officer of a hospital at which treatment was given shall be consulted on the radiation problems likely to be met in making an autopsy or in the disposal of the body.

4.4 When a body is to be released for direct burial without embalming no special precautions are normally required, but recommendations by the hospital radiation safety officer shall be observed.

4.5 Autopsies — general comments

4.5.1 If a corpse contains less than any of the following activities:

150 MBq radon-222 or gold-198;

300 MBq phosphorus-32;

450 MBq iodine-131 or gold-198;

the procedures normally observed during autopsy are adequate for the examination unless such examinations are carried out frequently in the same institution.

4.5.2 If, however, a corpse contains radioactive material of activity in excess of the levels given in 4.5.1, or if autopsies on corpses containing radioactive substances are frequently carried out in the same institution, the pathologist should, in consultation with the radiation safety officer, be informed of the radiation levels likely to be encountered and of the hazards involved. The methods employed and the precautions adopted should be chosen accordingly.

4.5.3 It is possible that an autopsy might be performed on a corpse containing radioactive material having an activity greater than specified in 4.5.1 without the knowledge of the medical officer concerned. In these circumstances the pathologist may not have been made aware of the presence of radioactive materials. As soon as such an incident is discovered, it should be reported to the radiation safety officer, so that proper decontamination and review of radiation exposure to pathologist and staff may be conducted.

4.5.4 Occasionally corpses are assigned to medical schools for dissection or are to be transported overseas. Any hazards to persons involved in these operations or the need for compliance with international transport regulations depend on several factors relating to the nature of the radioactive sources. In most instances the issue is resolved by keeping the corpse in appropriate cold storage until ten half-lives of radioactive decay have passed. The hospital or institution radiation safety officer shall be consulted for guidance.

4.6 Autopsies-general precautions

This clause is to be read in conjunction with instructions issued by the radiation safety officer (1.3).

4.6.1 Sealed sources of high-energy gamma rays, permanently implanted in the tissues (e.g. radon-222 or gold-198 seeds) should be removed, by block dissection if necessary, before the examination proceeds and stored at least 3 m from the working area. The sources themselves should be disposed of as radioactive waste.

4.6.2 If it is known that the radioactive material used for treatment will have been selectively absorbed in a particular organ, e.g. iodine-131 in the thyroid, the organ should be excised before the examination proceeds and removed from the work area. It may later be disposed of with the body.

4.6.3 If it is known that radioactive material used for treatment will be distributed in particular body fluids these should be drained off, using suitable equipment, before the examination proceeds. In general, these fluids may be safely disposed of via the sewerage system having regard to the requirements of legislation (see Clause 6). The equipment should later be decontaminated by thorough rinsing in a detergent solution followed by washing in running water.

4.6.4 Immediately after the post-mortem examination has been completed, radioactive contamination arising from the use of unsealed radioactive materials can be reduced by procedures devised in consultation with the radiation safety officer. Every effort shall be made to adopt procedures that minimize contamination, and any contamination should be removed immediately after the post mortem examination has been completed.

5 Precautions to be taken in the disposal of a corpse containing radioactive materials

5.1 No special precautions are normally required in the direct burial, without embalming, of corpses containing residual therapeutic doses of radionuclides, but recommendations by the hospital radiation safety officer shall be observed.

5.2 No special precautions are necessary for the embalming and burial of corpses containing not more than those levels of activity specified in 4.5.1.

5.3 Corpses containing activities greater than those specified in 4.5.1 should not normally be embalmed, but if there are special reasons for doing so in a particular case the embalmer should first consult the radiation safety officer at the hospital where treatment was given. All corpses in this category shall have a label attached, identifying the radionuclide and its activity at the time of death.

5.4 No special precautions are necessary for the cremation of corpses containing not more than 1 000 MBq of Rttrium-90, Iodine-131, Gold-198, Iodine-125, Radon-222 or, 400 MBq of Phosphorus-32. Corpses containing levels in excess of these values should be stored until these limits are reached.

5.5 The possibility that special circumstances may arise in the transport of a corpse containing radioactive materials should be considered in relation to the requirements of legislation covering the transport of radioactive materials. (See also Clause 6.)

6 Regulatory authorities

Legislation covering the transport and use of radioactive materials exists in Kenya and is administered by the Radiation Protection Board. Matters such as permissible levels of exposure, working conditions and personal monitoring are covered by the legislation.

Kenya Bureau of Standards (Kebs)

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