



PRELIMINARY SAFETY REGULATIONS FOR THE HANDLING OF THE NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORMS)

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Abstract

Naturally Occurring Radioactive Material (NORM) contains radium and thorium and such materials arise from the petroleum extraction industries. The safe handling of these NORM in Egypt implies identification of the responsibilities of both the producer of the NORM and the Central Radioactive Management Authority. In Egypt, this authority is the Hot Laboratory and Waste Management Centre (HLWMC). In the regulations NORM is classified into categories 1 and 2 according to their radiation level. The responsibilities of the producer include waste collection, packaging of category 1 and interim storage of category 2. The responsibilities of the HLWMC include transportation and long term storage of category 1. The responsibilities of the Regulatory Body and the licensing conditions are identified.

1. INTRODUCTION

Radioactive wastes resulting from petroleum extraction represent at the same time both a fact and a problem. A fact because their presence is dominant in most of the sites, and a problem because the presence of long lived radionuclides in these wastes may result in a considerable hazard to man and the environment. Dealing with these wastes requires developing both the required technologies and the relevant regulations to determine the responsibilities and identify the safety requirements for the handling of such wastes. This paper elucidates the main features of the proposed Regulations in Egypt. In these Regulations, the radiation protection principles of the IAEA Safety Series No. 115 will be applied.

2. RESPONSIBILITIES OF THE WASTE PRODUCER

These include:

- Waste collection,
- Packaging of the category containing high concentrations of radionuclides, and
- Storage of the other category than contains lower concentrations.

2.1 Waste Collection:

The wastes are classified into two categories; Category 1 where the Ra-226 concentration is equal to or higher than 60 Bq/g (dose rate about 6.0 microsievert/hr), and Category 2 with Ra-226 concentration lower than 60 Bq/gm. The two categories are collected separately. The collection place shall be away from the other activities in the site. The place shall be provided with radiation monitoring systems. Radiation protection principles shall be applied. Contaminated equipment and pipes of surface dose rate higher than 0.5

microsievert/hr should be collected separately awaiting for the decision either be decontaminated or considered as wastes. The collecting place shall be in the downwind of the other surrounding activities. Also, it should be easily accessed. Periodic radiation monitoring in the surrounding areas shall be performed.

2.2 Packaging of Category 1

This is carried out for wastes of Category 1 and for pipes and equipment that cannot be decontaminated. Collected wastes are packaged in metallic containers of 200 l capacity lined with thick plastic bags. The metallic containers should be painted against corrosion on the internal surface and the external surface should be painted with a characterising colour. Each Producer should have a certain colour. After filling and sealing the container, the outside surface is checked for contamination (limit is 0.04 Bq/cm^2). Decontamination is carried out if necessary. The container is labelled with a radiation sign and a card is fixed on the surface. This card should contain the following information: the company producing the wastes and its site, the packaging date, the dose rate at the surface, and at 1 meter, and the container number. The radiation protection principles are applied in the packaging, the cutting and the decontamination. The workers should be provided with the protective clothes, masks and personal dosimeters. This should be performed under the supervision of the Atomic Energy Authority. The products of the decontamination should be collected and treated as radioactive wastes. It is recommended, in case of lack of experience, to ask help from the Atomic Energy Authority.

2.3 Interim Storage of the Packaged Wastes (Category 1)

An interim storage place shall be prepared for the packaged wastes. The store shall be of sufficient capacity and provided with a radiation monitoring system. The storage area shall be fenced and completely covered. The floor shall be of reinforced concrete. An area should be left between the stored wastes and the fence to keep the dose rate at the fence within the permissible value. A suitable area shall be present for loading and unloading. Access is limited only for authorised persons, and a physical protection system should be implemented. Radioactive wastes are only accepted in the store and with complete information. The workers shall follow radiation protection principles and they should be provided with personal dosimeters. Before delivery to the Atomic Energy Authority, a copy of the information about the packages to be delivered should be sent to the Authority. Fax or E-mail can facilitate this process, the producer should keep the original. This process shall be licensed by the National Centre for Nuclear Safety and Radiation Control (NCNSRC).

2.4 Safe Keeping (Storage) of Category 2

The storage site shall be at an appropriate distance from the other activities. It shall be downwind of these activities and it shall be fenced. Storage can be carried out in concrete pools of wall thickness 25 cm (reinforced concrete). After filling the pools they shall be covered with corrugated steel covers. The design shall be in such a way that the rainwater is directed outside the pools. This process shall be licensed from the National Centre of Nuclear Safety and Radiation Control. The licensing process shall include siting, design, operation and surveillance.

3. RESPONSIBILITIES OF THE HOT LABORATORIES AND WASTE MANAGEMENT CENTER

The responsibilities of the Hot Laboratories and Waste Management Center of the Atomic Energy Authority include: transportation, and long term safe storage. The centre carries out also treatment processes according to the available technology.

3.1 Transportation

The packaged wastes of Category 1 are transported to the site of HLWMC. The decision on disposal will be taken later according to the available technology. This is carried out according to the IAEA safety series No.6. Local circumstances are considered either for the operation or to the driver qualification. This process shall be licensed from the NCNSRC

3.2 Long Term Safe Storage of Radwastes

This is performed in special stores sited and designed according to special criteria. The store shall be of sufficient capacity to accommodate the quantities expected to be produced. The store should be provided with physical protection and a radiation monitoring system. The dose rate outside the store shall not exceed 10 microsievert/hr. A database should be implemented to keep all the information about the stored waste. Redundant record keeping methods are necessary to avoid loss of the information. The store and the storage operation shall be licensed by the NCNSRC.

4. RESPONSIBILITIES OF NCNSRC

The national centre for nuclear safety and radiation control (NCNSRC), Atomic Energy Authority, is the regulatory body in Egypt. It is responsible for the safety of persons, society and the facilities from the radiological point of view. Its responsibilities include:

1. Preparation of regulations, criteria identification, preparation of guides and responding to enquiries.
2. Issuing the licences required for the different processes relevant to NORM (Decontamination, interim storage for packaged wastes, safe storage for un-packaged wastes, transportation and long term storage at the site of the Hot Laboratories Centre). This requires reviewing the licensing applications, documents and ensuring the adequacy of the information with the safety requirements.
3. Inspection and control of all the previous processes.

References

- [1] INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Safety Series No. 115.
- [2] INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Safety Series No. 6.
- [3] Egyptian Safety Regulations for Radioactive Wastes. Official Journal, July 1999.