

IAEA SAFETY STANDARDS SERIES

Near Surface Disposal of Radioactive Waste

REQUIREMENTS

No. WS-R-1



INTERNATIONAL
ATOMIC ENERGY AGENCY
VIENNA

IAEA SAFETY RELATED PUBLICATIONS

IAEA SAFETY STANDARDS

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NEAR SURFACE DISPOSAL OF RADIOACTIVE WASTE

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The Agency's Statute was approved on 23 October 1956 by the Conference on the Statute of the IAEA held at United Nations Headquarters, New York; it entered into force on 29 July 1957. The Headquarters of the Agency are situated in Vienna. Its principal objective is "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world".

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NEAR SURFACE DISPOSAL OF RADIOACTIVE WASTE

SAFETY REQUIREMENTS

INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 1999

FOREWORD BY THE DIRECTOR GENERAL

One of the statutory functions of the IAEA is to establish or adopt standards of safety for the protection of health, life and property in the development and application of nuclear energy for peaceful purposes, and to provide for the application of these standards to its own operations as well as to assisted operations and, at the request of the parties, to operations under any bilateral or multilateral arrangement, or, at the request of a State, to any of that State's activities in the field of nuclear energy.

The following advisory bodies oversee the development of safety standards: the Advisory Commission on Safety Standards (ACSS); the Nuclear Safety Standards Advisory Committee (NUSSAC); the Radiation Safety Standards Advisory Committee (RASSAC); the Transport Safety Standards Advisory Committee (TRANSSAC); and the Waste Safety Standards Advisory Committee (WASSAC). Member States are widely represented on these committees.

In order to ensure the broadest international consensus, safety standards are also submitted to all Member States for comment before approval by the IAEA Board of Governors (for Safety Fundamentals and Safety Requirements) or, on behalf of the Director General, by the Publications Committee (for Safety Guides).

The IAEA's safety standards are not legally binding on Member States but may be adopted by them, at their own discretion, for use in national regulations in respect of their own activities. The standards are binding on the IAEA for application in relation to its own operations and to operations assisted by the IAEA. Any State wishing to enter into an agreement with the IAEA for its assistance in connection with the siting, design, construction, commissioning, operation or decommissioning of a nuclear facility or any other activities will be required to follow those parts of the safety standards that pertain to the activities to be covered by the agreement. However, it should be recalled that the final decisions and legal responsibilities in any licensing procedures rest with the States.

Although the safety standards establish an essential basis for safety, the incorporation of more detailed requirements, in accordance with national practice, may also be necessary. Moreover, there will generally be special aspects that need to be assessed by experts on a case by case basis.

The physical protection of fissile and radioactive materials and of nuclear power plants as a whole is mentioned where appropriate but is not treated in detail; obligations of States in this respect should be addressed on the basis of the relevant instruments and publications developed under the auspices of the IAEA. Non-radiological aspects of industrial safety and environmental protection are also not explicitly considered; it is recognized that States should fulfil their international undertakings and obligations in relation to these.

The requirements and recommendations set forth in the IAEA safety standards might not be fully satisfied by some facilities built to earlier standards. Decisions on the way in which the safety standards are applied to such facilities will be taken by individual States.

The attention of States is drawn to the fact that the safety standards of the IAEA, while not legally binding, are developed with the aim of ensuring that the peaceful uses of nuclear energy and of radioactive materials are undertaken in a manner that enables States to meet their obligations under generally accepted principles of international law and rules such as those relating to environmental protection. According to one such general principle, the territory of a State must not be used in such a way as to cause damage in another State. States thus have an obligation of diligence and standard of care.

Civil nuclear activities conducted within the jurisdiction of States are, as any other activities, subject to obligations to which States may subscribe under international conventions, in addition to generally accepted principles of international law. States are expected to adopt within their national legal systems such legislation (including regulations) and other standards and measures as may be necessary to fulfil all of their international obligations effectively.

PREFACE

Radioactive waste is produced in the generation of nuclear power and the use of radioactive materials in industry, research and medicine. The importance of the safe management of radioactive waste for the protection of human health and the environment has long been recognized, and considerable experience has been gained in this field.

The IAEA's Radioactive Waste Safety Standards (RADWASS) programme is aimed at establishing a coherent and comprehensive set of principles, requirements and recommendations for the safe management of radioactive waste and formulating the guidelines necessary for their application. This is accomplished within the IAEA Safety Standards Series in an internally consistent set of documents that reflect an international consensus. The RADWASS publications will provide Member States with a comprehensive series of internationally agreed safety standards to assist in the derivation of, and to complement, national criteria, standards and practices.

The present Safety Requirements publication sets out the basic safety requirements related to the disposal of radioactive wastes in near surface repositories. It includes requirements for the protection of human health, for the assessment procedures needed to ensure that safety is achieved, and technical requirements for waste acceptance and for siting, design, construction, operation and closure of the repository and the post-closure phase. The requirements are derived from the basic principles for radioactive waste management set out in the Safety Fundamentals publication on The Principles of Radioactive Waste Management (Safety Series No. 111-F). Guidance on the implementation of the requirements is provided in a number of associated Safety Guides.

This Safety Requirements publication was developed through a series of consultants and Technical Committee meetings and reviewed by the Waste Safety Standards Advisory Committee (WASSAC), the Advisory Commission for Safety Standards (ACSS) and Member States.

The IAEA wishes to express its appreciation to all those who assisted in drafting and review.

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EDITORIAL NOTE

An appendix, when included, is considered to form an integral part of the standard and to have the same status as the main text. Annexes, footnotes and bibliographies, if included, are used to provide additional information or practical examples that might be helpful to the user.

The safety standards use the form 'shall' in making statements about requirements, responsibilities and obligations. Use of the form 'should' denotes recommendations of a desired option.

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1. INTRODUCTION

BACKGROUND

1.1. Radioactive waste, as a source of ionizing radiation, represents a potential hazard to human health and must be carefully managed so as to reduce the associated risks to acceptable levels. The safety principles to be applied are set out in the RADWASS Safety Fundamentals publication "The Principles of Radioactive Waste Management" [1].

1.2. The present Safety Requirements publication is concerned with the disposal of certain types of solid or solidified radioactive wastes by emplacement near the surface of the earth. The term 'near surface disposal' encompasses a wide range of options, including disposal in engineered structures on the ground, disposal in simple earthen trenches a few metres deep, disposal in engineered concrete vaults and disposal in rock caverns several tens of metres below the earth's surface. In contrast, the term 'geological disposal' is generally used to describe disposal at depths of hundreds of metres. 'Disposal' is taken to mean the emplacement of waste in approved, specified facilities, without the intention of retrieving it.

1.3. In general, wastes suitable for disposal in near surface repositories are those containing short lived radionuclides and low concentrations of long lived radionuclides [2]. For wastes of this type, disposal in near surface facilities has been practised in a number of countries for several decades. Experience has shown that this is a realistic and practical method for the safe isolation of such wastes and for achieving the protection of human health and the environment, subject to appropriate regulation.

1.4. There are three phases associated with the lifetime of a near surface repository: pre-operational, operational and post-closure. The pre-operational phase includes the necessary siting and design studies and the period of construction of the repository. The operational phase includes the period of operations at the repository and the closure of the repository. The post-closure phase includes any activities following closure of the repository (for example, periods of active or passive controls). Activities related to each of these phases should be carried out consistent with the requirements of this Safety Requirements publication and with the guidance provided in the companion RADWASS Safety Guides [3, 4].

OBJECTIVE

1.5. The objective of this Safety Requirements publication is to set out the basic requirements that international experience has shown to be necessary for ensuring the safety of near surface radioactive waste repositories.