

IAEA SAFETY STANDARDS SERIES

Safety of Nuclear Power Plants: Operation

REQUIREMENTS

No. NS-R-2



INTERNATIONAL
ATOMIC ENERGY AGENCY
VIENNA

IAEA SAFETY RELATED PUBLICATIONS

IAEA SAFETY STANDARDS

Under the terms of Article III of its Statute, the IAEA is authorized to establish standards of safety for protection against ionizing radiation and to provide for the application of these standards to peaceful nuclear activities.

The regulatory related publications by means of which the IAEA establishes safety standards and measures are issued in the **IAEA Safety Standards Series**. This series covers nuclear safety, radiation safety, transport safety and waste safety, and also general safety (that is, of relevance in two or more of the four areas), and the categories within it are **Safety Fundamentals**, **Safety Requirements** and **Safety Guides**.

Safety Fundamentals (blue lettering) present basic objectives, concepts and principles of safety and protection in the development and application of nuclear energy for peaceful purposes.

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Information on the IAEA's safety standards programme (including editions in languages other than English) is available at the IAEA Internet site

www.iaea.org/ns/coordinet

or on request to the Safety Co-ordination Section, IAEA, P.O. Box 100, A-1400 Vienna, Austria.

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SAFETY OF NUCLEAR POWER PLANTS: OPERATION

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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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FOREWORD

by Mohamed ElBaradei
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 for 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 in relation to its own operations and on States in relation 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.

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. The safety of a nuclear power plant is ensured by means of its proper siting, design, construction and commissioning, followed by the proper management and operation of the plant. In a later phase, proper decommissioning is required.

1.2. This Safety Requirements publication supersedes the Code on the Safety of Nuclear Power Plants: Operation, which was issued in 1988 as Safety Series No. 50-C-O (Rev. 1). The purpose of this revision was: to restructure Safety Series No. 50-C-O (Rev. 1) in the light of the basic objectives, concepts and principles in the Safety Fundamentals publication The Safety of Nuclear Installations [1]; to be consistent with the requirements of the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources [2]; and to reflect current practice and new concepts and technical developments.

1.3. Guidance on fulfilment of these Safety Requirements may be found in the appropriate Safety Guides relating to plant operation.

OBJECTIVE

1.4. The objective of this publication is to establish the requirements which, in the light of experience and the present state of technology, must be satisfied to ensure the safe operation of nuclear power plants. These requirements are governed by the basic objectives, concepts and principles that are presented in the Safety Fundamentals publication The Safety of Nuclear Installations [1].

SCOPE

1.5. This publication deals with matters specific to the safe operation of land based stationary thermal neutron nuclear power plants, and also covers their commissioning and subsequent decommissioning.

STRUCTURE

1.6. This publication consists of 11 sections. Section 2 relates to the requirement to establish an operating organization with an effective organizational structure with overall responsibility for the safe operation of a nuclear power plant. Sections 3–7 establish the requirements for the safe operation of a plant in areas such as qualification of personnel, commissioning, maintenance, surveillance and inspection activities, to ensure that the plant is operated within the design envelope. Section 8 establishes requirements for radiation protection and radioactive waste management. Sections 9 and 10 establish requirements for documented records and reports and for periodic safety review. Section 11 establishes requirements for the final stage of the life cycle of the plant, namely decommissioning.

2. OPERATING ORGANIZATION

GENERAL REQUIREMENTS

2.1. The operating organization, as licensee, shall have responsibility for the safe operation of the nuclear power plant. The operating organization shall retain prime responsibility for safety but it may delegate authority to the plant management for the safe operation of the plant. In such cases the operating organization shall provide the necessary resources and support. The management of the plant shall ensure that the plant is operated in a safe manner and in accordance with all legal and regulatory requirements.

2.2. The operating organization shall place special emphasis on safety in operation. It shall establish and effect policies that give safety matters the highest priority. Although the operating organization may already have an organizational structure for managing non-nuclear power plants, the special emphasis on safety will necessitate more than merely an extension of the existing organizational structure.

2.3. In establishing the organizational structure of the operating organization, consideration shall be given to the following management functions:

- (1) Policy making functions, which include: setting management objectives; establishing policy for nuclear safety and for quality; allocating resources; providing material and human resources; approving the contents of management programmes; setting policies on fitness for duty; and establishing a programme

to make the necessary changes to any of these functions on the basis of the performance in achieving objectives.

- (2) Operating functions, which include executive decision making and actions for the operation of a plant, both in operational states and in accidents.
- (3) Supporting functions, which include obtaining from both on-site and off-site organizations the technical and administrative services and facilities necessary to perform the operating functions.
- (4) Reviewing functions, which include critical monitoring of the performance of the operating and supporting functions, and review of the design. The purpose of monitoring is to verify compliance with the stipulated objectives for safe operation of the plant; to reveal deviations, deficiencies and equipment failures; and to provide information for the purpose of taking timely corrective action and making improvements. Reviewing functions also include review of the overall safety performance of the organization in order to assess the effectiveness of safety management and to identify opportunities for improvement.

2.4. The organizational structure shall be established and documented so as to ensure that the following responsibilities are discharged with respect to achieving safe operation of nuclear power plants:

- (1) Responsibilities shall be allocated and authority shall be delegated within the operating organization.
- (2) Satisfactory conduct of management programmes shall be established and verified.
- (3) Adequate training for personnel shall be provided.
- (4) Liaison shall be established with the regulatory body and with public authorities for the purposes of ensuring understanding of and compliance with safety requirements.
- (5) Liaison shall be established with organizations for design, construction, manufacturing and plant operation and with other organizations (national and international) as necessary to ensure the proper transfer of information, expertise and experience and the ability to respond to safety issues.
- (6) Adequate resources, services and facilities shall be provided.
- (7) Adequate public consultation and liaison shall be provided for.

2.5. A document describing the plant's organizational structure and the management arrangements for discharging all these responsibilities shall be made available to the regulatory body for review. In addition, proposed changes to the structure and associated arrangements which might be significant to safety shall be systematically reviewed by the operating organization and shall be submitted to the regulatory body for review.