CHAPTER - 06

REGULATORY SAFETY DOCUMENTS

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One of the core activities of AERB is to develop the safety regulation for different types of facilities and activities under its purview. Development and revision of Regulatory Safety Documents (REGDOCs) is a continual process of AERB to keep itself updated in line with international recommendations, national requirements and good practices. Through this process, the existing REGDOCs are taken up for revision and new REGDOCs are identified for development, as necessary. Accordingly, AERB has put in place a process for development / revision of REGDOCs.

The process of REGDOC development takes into account the following aspects:

- Outcome of Safety Reviews / Legal Views / Technical Discussions
- Requirements identified during consenting, regulatory inspection and enforcement process
- New regulatory and technologic developments relevant to AERB
- International practices
- Specific aspects of recommended/ accepted practices
- Experience/Feedback from Nuclear and Radiation Facilities

REGDOCs issued by AERB are classified as follows in descending order of hierarchy:

a) Safety Codes/ Safety Standards

b) Safety Guides

c) Safety Manuals

Pictorial representation of the REGDOCs hierarchy is as follows:

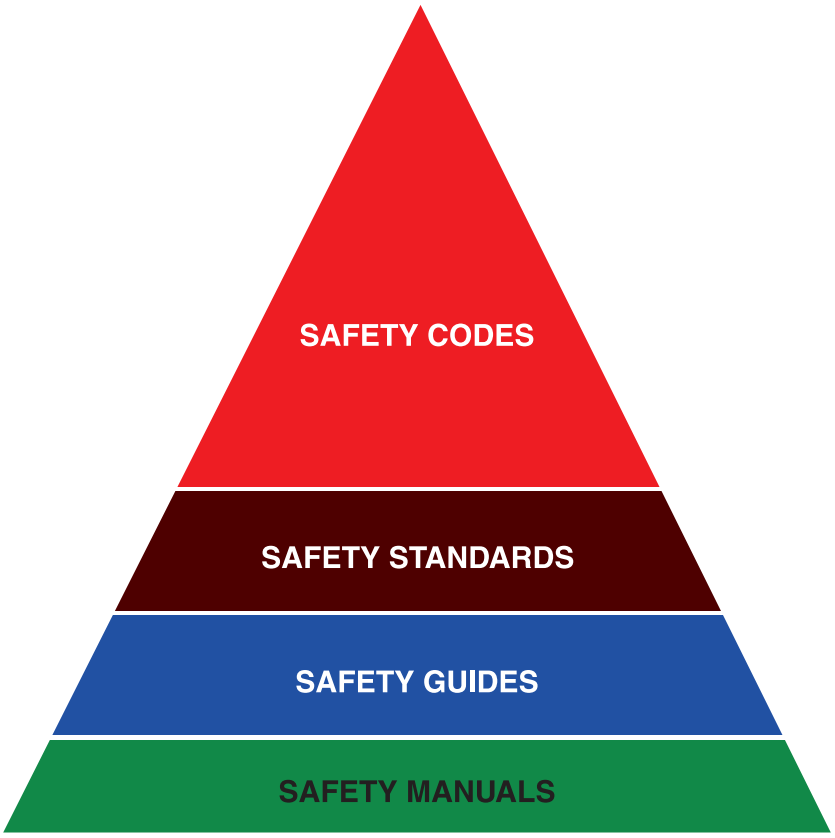


Fig.6.1 Hierarchy of REGDOCs

Safety codes and safety standards establish the objectives and set requirements that shall be fulfilled to provide adequate assurance for safety. Safety guides elaborate various requirements and furnish approaches for their implementation. Safety manuals deal with specific topics and contain detailed scientific / technical information on the subject.

AERB has issued regulations and other safety documents, which provide adequate coverage that commensurates with the radiation risks associated with the facilities and activities, following graded approach. Till date, AERB has published 153 regulatory safety documents which include Safety Codes, Standards, Guidelines, Guides and Manuals.

6.0 Regulatory Safety Documents Development Process

AERB has an established process for development, review, revision and publication of REGDOCs. The REGDOC development process follows multi-tier review system, which is based on graded approach.

The process of development of new or revision of old REGDOCs start with Safety Document Development / Revision Proposal (SDDP / SDRP) It is prepared by technical staff of AERB based on the requirements emanated from the review of inputs from various regulatory processes, operating experience, among others. The SDDP, SDRP is then reviewed in AERB as per established procedure before it is approved by Chairman, AERB.

After approval of the SDDP, the initial draft of the REGDOC is prepared in house in AERB and is reviewed by respective Task Force constituted for the purpose. Technological advances, R&D work, relevant operational lessons learned and institutional knowledge as appropriate are considered in development/revision of the REGDOCs. REGDOCs development process also involves participation of experts, utility and stakeholders by direct involvement as well as through comments and feedback. The draft is also reviewed by respective standing committees and apex committee based on graded approach.

Advisory Committee on Nuclear and Radiation Safety (ACNRS), an apex committee, supports AERB in the review of draft regulatory documents and safety issues. ACNRS consists of senior experts in the areas relevant to nuclear & radiation safety and its regulation.

After technical and copy editing and quality checks, the draft is approved by Chairman, AERB for publication. In case of Safety Codes and Safety Standards, public comments are also sought on the draft before its finalization. Subsequently the draft is reviewed and approved by the Board of AERB.

AERB REGDOCs

The progress on REGDOCs development / revision during the year is given below:

6.1 Regulatory Safety Documents Developed/ Revised

In year 2022, one Safety Code, four Safety Guides and AERB Safety Glossary 2022 Edition were developed/ revised and uploaded on AERB website. Details of these are as follows:

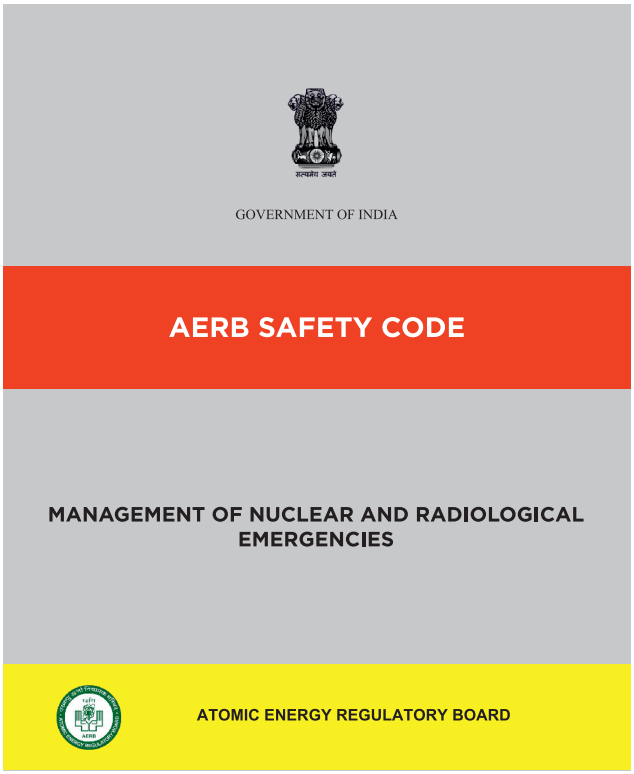
6.1.1 Safety Code on 'Management of Nuclear and Radiological Emergencies' [AERB / NRF/SC/ NRE]

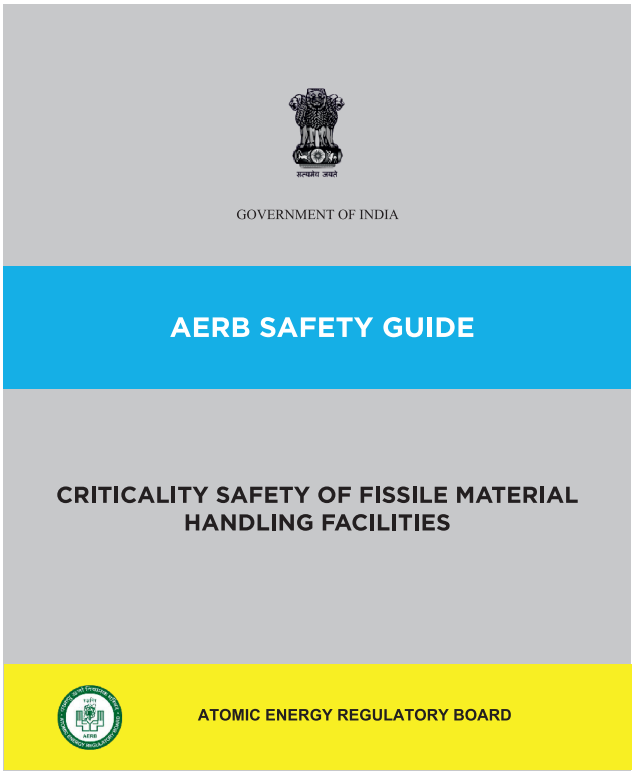
The Safety Code prescribes the AERB requirements that are to be fulfilled by the licensees and various other authorities / agencies responsible for management of nuclear and radiological emergencies. The requirements prescribed in this code are derived from existing regulatory guidelines, relevant national and international safety standards, and publications of ICRP and IAEA. The Safety Code also takes account of current National Disaster Management Plan (NDMP) 2019, enhancements in emergency exercise methodology and the importance of early phase decision making. The code covers requirements on General, Functional and Infrastructural elements of EPR framework for effective management of Nuclear and Radiological Emergencies.

Three associated specific guides for management of emergencies in nuclear facilities, radiation facilities and during transport of radioactive material respectively are being developed. The requirements and guidance in these documents were finalized following a bottom to top approach that incorporates the outcomes of technical documents developed by AERB on various developmental areas and feedback from its implementation.

6.1.2 AERB Safety Guide on 'Criticality Safety of Fissile Material Handling Facilities' [AERB /FCF/ SG-3]

This Safety Guide provides guidance on preventing criticality or maintaining sub-criticality in handling, processing, storage and transport of fissile materials in NRFs other than a nuclear reactor. It also includes guidance for R&D facilities and activities that use fissile material and to the transport of packages containing fissile material. This safety guide specifies the requirements for criticality monitoring system, criticality alarm system, effective emergency planning and response to a criticality accident.

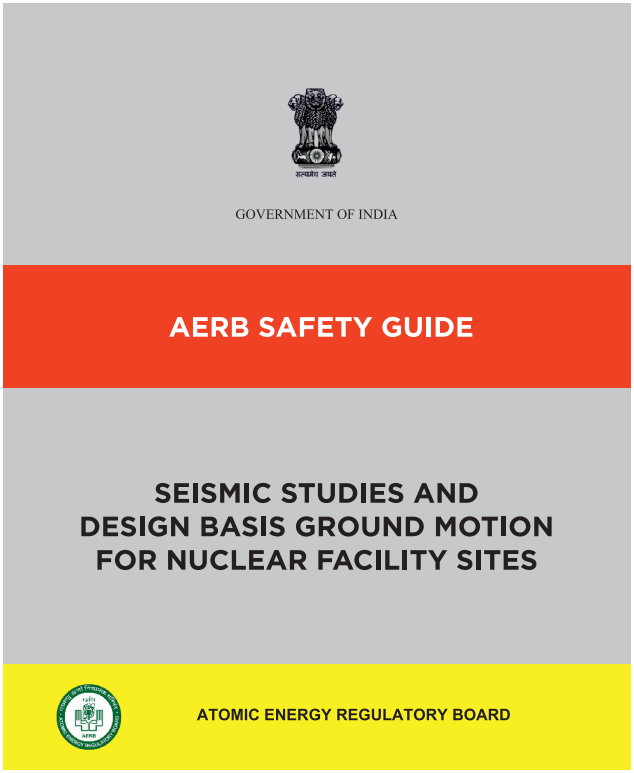




6.1.3 AERB Safety Guide on 'Seismic Studies and Design Basis Ground Motion for Nuclear Facility Sites' [AERB/NF/SG/S-11 (Rev. 1)]

This Safety Guide provides guidance for the methodology to be adopted in deriving the design basis ground motion parameters for safety evaluation of NFs. It also includes guidance on secondary hazards associated with earthquake such as, surface faulting, potential for liquefaction, ground failure, and slope instability, establishment of micro-earthquake (MEQ) network, seismic instrumentation, pre and post-earthquake action. In addition, the Safety Guide covers the aspects of assessment of hazard due to seismically generated water waves and related flood hazard.

6.1.4 AERB Safety Guide on 'Periodic Safety Review for NPPs' [AERB/NPP/SG/O-12 (Rev -.1)]

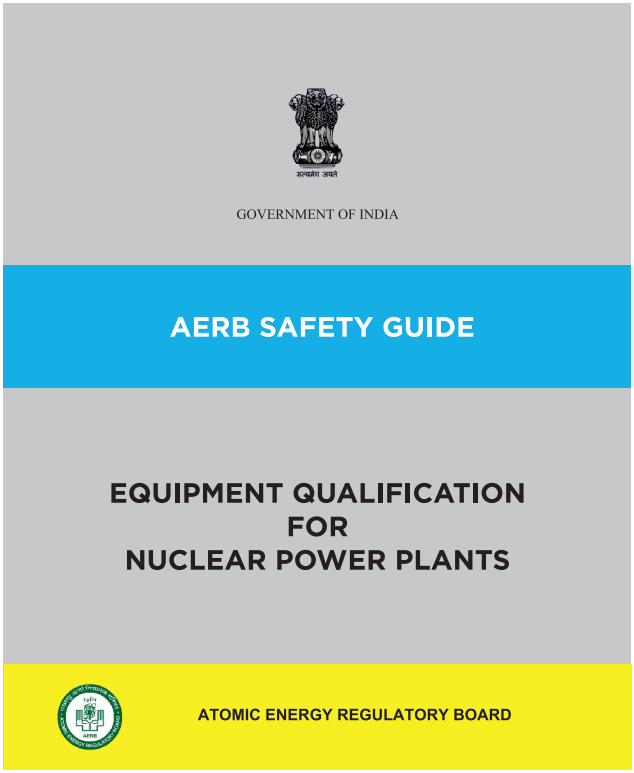


This Safety Guide provides guidance for carrying out systematic safety assessment during periodic safety reviews of NPPs. The safety guide also provides guidance on the corresponding submissions to be made to AERB. The guidance can also be used for special review in response to the major events related to safety significance, Limited Scope Safety Reviews, restart of NPP after extended shutdown, PSR of research reactor.

6.1.5 Safety Guide on 'Equipment Qualification for NPPs' [AERB/NPP/SG/D-27]

This Safety Guide provides guidance for the qualification of equipment in nuclear power plants that are required to function under normal operational conditions and during accident conditions. It also provides guidance on measures to preserve equipment qualification throughout its qualified life or during its extended qualified life.

6.1.6 AERB 'Glossary of Terms for Nuclear and Radiation Facilities and Associated Activities' [AERB/GLO (Rev.1)]



The Glossary is a compilation of terms used in various AERB REGDOCs for nuclear and radiation facilities. The Glossary has been updated in view of

the latest international standards.

6.2 Safety Documents under Revision/ Development

REGDOCs on different topics are being developed or being revised in accordance with established process.

6.2.1 R1-Drafts (First Stage) of the following REGDOCs were prepared

i. Safety Guide on 'Radiation Protection in Design for NPPs' [AERB/NPP/SG/D-12 (Rev .1)]

ii. Safety Guide on 'Research Applications' [AERB/RF/ SG/RA]

iii. Safety Manual on 'Radiation Protection for NFs' [AERB/NF/SM/O-2 (Rev. 5)]

iv. Safety Guide on X-Ray Generating Equipment used for Research, Education,Inspection and Analysis [AERB/RF/SG-/XREIA]

6.2.2 Following REGDOCs under Various Stages of Devlopment

i. Safety Code on 'Design of PHWR based NPPs' [AERB/NPP-PHWR/SC/D (Rev. 2)]

ii. Safety Code on 'Design of Sodium Cooled Fast Reactor based NPPs' [AERB/NPP-SFR / SC/D]

iii. Safety Code on 'Radiation Sources, Equipment & Installations' [AERB/SC/RF (New)]

iv. Safety Code on 'Regulation of Nuclear and Radiation Facilities' [AERB/SC/G (Rev.1)]

v. Safety Guide on 'Industrial Radiography' [AERB/RF/SG/IR]

vi. Safety Guide on 'Industrial Accelerator Radiation Processing Facility' [AERB/RF/-SG/ IARPF]

vii. Safety Guide on 'Medical Cyclotron Facility' [AERB/RF/SG/MCF (Rev.1)]

viii. Safety Guide on 'Manufacture, Supply and Use of Medical Diagnostic X-ray Equipment' [AERB/RF/SG/DR]

ix. Safety Guide on 'Container Scanner' [AERB/RF/SG/CS]

x. Safety Guide on 'Safety Classification and Seismic Categorization for NPPs' [AERB/SG /D-1(Rev.1)]

xi. Safety Guide on 'Design of Fuel Handling and Storage Systems for NPPs' [AERB/SG/D-24 (Rev.1)]

xii. Safety Guide on 'In Service Inspection of NPPs' [AERB /SG/O-2 (Rev.1)]

xiii. Safety Guide on 'Deterministic Safety Analysis for Water Cooled Reactor based NPPs' [AERB/NPP-WCR/SG/D-19]

xiv. Safety Guide on 'Gamma and X-Ray Irradiation Chamber' [AERB/RF/SG/GXIC]

xv. Safety Guide on 'Nucleonic Gauges' [AERB/ RF/SG/NG]

6.3 Development of Strategies for Regulation of Emerging Technologies and Emerging Regulatory Issues

As a part of preparedness towards future needs for regulation of emerging technologies, AERB is in the process of developing a strategy for addressing the identified anticipated safety issues in the regulation of emerging technologies. The practices followed by regulatory agencies of other countries and initiative taken by IAEA for harmonization of regulatory requirements for the emerging technologies are being studied. AERB is also working towards development of strategic plans for (i) safety regulation during 'Long Term Operation' of nuclear power plants and (ii) further enhancement of competencies of regulatory staff on Human and Organizational Factors (HOF).

6.4 Review of IAEA Draft Safety Standards

AERB also contributes in review of draft IAEA REGDOCs. The following IAEA documents were received/reviewed by AERB in 2022:

6.4.1 IAEA Draft Safety Guides on

i. Commissioning of Research Reactors - Ds509 A

ii. Maintenance, Periodic Testing and Inspection of Research Reactors - Ds509 B

iii. Core Management and Fuel Handling for Research Reactors - Ds509 C

iv. Operational Limits and Conditions and Operating Procedures for Research Reactors - Ds509 D

v. The Operating Organization and the Recruitment, Training and Qualification of Personnel for Research Reactors - Ds509 E

vi. Radiation Protection and Radioactive Waste Management in the Design and Operation of Research Reactors - DS 509 F

vii. Ageing Management for Research Reactors - Ds509 G

viii. Instrumentation and Control Systems and Software Important to Safety for Research Reactors - Ds509 H

ix. Radiation Safety of Radiation Sources used in Research and Education - Ds470

x. Application of the Concept of Exemption - Ds499

xi. Application of the Concept of Clearance - Ds500

xii. Radiation Protection Programmes for the Transport of Radioactive Material - Ds521

xiii. Development and Application of Level 1 Probabilistic Safety Assessment for NPPs - Ds523

xiv. Safety Guide on Radiation Protection Aspects of Design for NPPs -Ds524

6.4.2 IAEA Draft Specific Safety Guides on

i. Use of a Graded Approach in the Application of the Safety Requirements for Research Reactors – DS 511

ii. Safety of Conversion Facilities and Uranium Enrichment Facilities - Ds517 A

iii. Safety of Uranium Fuel Fabrication Facilities - DS517B

iv. Safety of Uranium and Plutonium Mixed Oxide Fuel Fabrication Facilities (Revision of SSG-7) - DS517C

v. Hazards Associated with Human induced External Events in Site Evaluation for Nuclear Installations - Ds520

6.4.3 IAEA New Draft Safety Guides on

i. Periodic Safety Review for NPPs, (revision of SSG-25) - DPP DS-535

ii. Safety Demonstration of Innovative Technology in Reactor Designs - DPP DS-537

iii. Long Term Post-Remediation Management of Areas Affected by Past Activities or Events - DPP DS-538

iv. Licensing Process for Nuclear Installations, (revision of SSG-12) - DPP DS-539

v. Radiation Safety for Industrial Radiography, (revision of SSG-11) - DPP DS-540

vi. Management of the Interfaces Between Nuclear and Radiation Safety and Nuclear Security - DPP DS-533

vii. Technical Guidance document on Security of Nuclear and other Radioactive Material in Transport NST-053