

# **Participation of Stakeholders in Document Development Process: Evolution and Improvements**

**K. Srivasista**

**Director**

**Resources and Documentation Division**

**AERB**

*National Conference on Regulatory Interface: November 28, 2017*

# OUTLINE

- Mission
- Categories of AERB Regulatory Safety Documents
- AERB Regulatory Safety Documents Hierarchy
- Users and applicability of AERB Regulatory Safety Documents
- Development Process
- Interaction with International Organizations
- Interpretation of the Text
- Historical Perspective
- New Concepts in Regulation of Nuclear Power Plants
- Enhancing Safety
- Operating Licence for Design Life
- New Concepts in Safety Regulation of Radiation Facilities

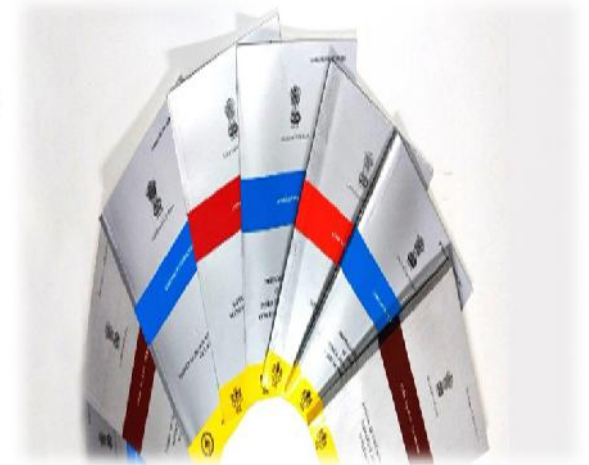
# MISSION

Protection of occupational workers, members of public and the environment from harmful effects of ionizing radiation:

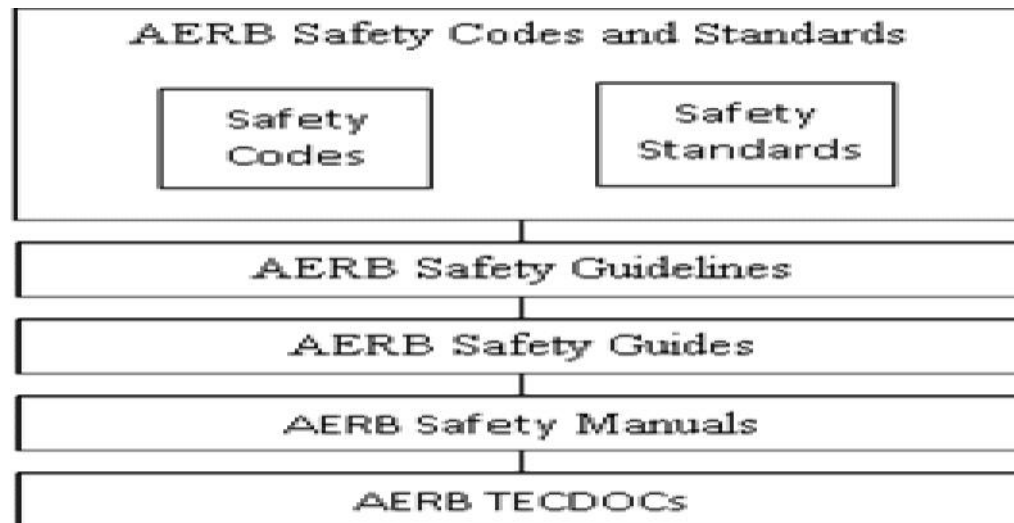
Establish regulatory requirements and guidance at all stages of lifetime of Nuclear and Radiation facilities such that the **radiation exposure** of people and the **release of radioactive material** to the environment are controlled, and the **consequences** of such events if they were to occur are **mitigated**.

# Categories of AERB REGULATORY SAFETY DOCUMENTS

- Safety Codes** : qualitative requirements (mandatory)
- Safety Standards** : quantitative requirements (mandatory)
- Safety Guidelines**: requirements and guidance
- Safety Guides** : guidance
- Safety Manual** : detailing safety aspects/ instructions
- Tech. doc.** : detailed scientific and technical information in regulatory process



# AERB REGULATORY SAFETY DOCUMENT HIERARCHY



# USERS AND APPLICABILITY OF AERB REGULATORY SAFETY DOCUMENTS

- The principal users of AERB regulatory safety documents are **applicants, licensees, and other associated persons** in nuclear and radiation facilities
- Applicable throughout the lifetime of radiation and nuclear facilities and associated activities
- Form the **basis** for AERB's core regulatory activities.

# DEVELOPMENT PROCESS

- AERB has established a process for development, review, revision and publication of regulatory safety documents for use in regulation of **nuclear and radiation** facilities.
- **Experts, utility and interested parties** are involved in the development of the regulations and guides by direct involvement as well as through comments and feedbacks throughout the development process. Senior officers of NPCIL, BARC and IGCAR chair AERB Committees.

## DEVELOPMENT PROCESS (contd.)

- Following aspects are considered as appropriate in development/ revision of the regulations and guides:
  - International safety standards
  - Technological advances
  - Research and development
  - Relevant operational lessons learned
  - Institutional knowledge
  - Feedback on the published documents
- A nodal officer is identified in each division of AERB and made responsible for keeping track of development/changes in relevant areas.
- The documents are revised based on the above inputs as and when required.



## **DEVELOPMENT PROCESS (contd.)**

- Periodic updates are provided by nodal officers to RDS (RDD), which upon review of such inputs decides on the need for development/revision of a safety document. Having identified the document to be prepared/revise, a technical note is prepared by the concerned division of AERB and circulated within AERB for comments.

## DEVELOPMENT PROCESS (contd.)

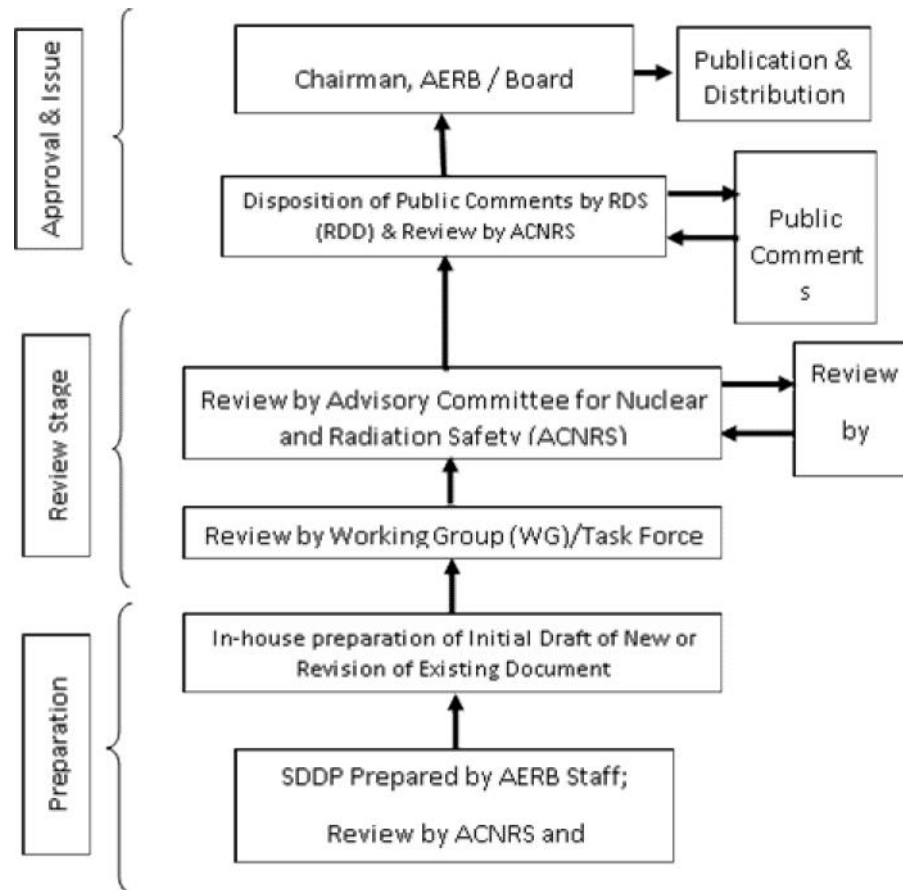
- Once the in principle agreement is achieved through executive committee of AERB, Safety Document Development Proposal (SDDP) is prepared by the concerned division of AERB.
- The revised SDDP is reviewed within AERB and suitably revised based on comments
- SDDP is forwarded to newly established **Advisory Committee on Nuclear and Radiation Safety (ACNRS)** for review.
- Based on the recommendation of ACNRS, SDDP is finally approved by Chairman, AERB.
- Upon approval of SDDP, the R0 draft of the proposed new/revision of document is prepared In-House within AERB/Consultant.

## **DEVELOPMENT PROCESS (contd.)**

- Initial draft is reviewed by a TF/WG duly constituted for the purpose in a time bound manner.
- The draft is put up to ACNRS for review
- Revised draft is circulated among the experts, both within and outside DAE for obtaining their review comments.
- The resulting draft is sent for approval from Chairman, AERB.

In case of Safety Codes, the draft is put up on AERB external website for public comments (for specified time). The disposition of public comments is carried out by RDS (RDD). The disposition would be put to ACNRS before placing it in Board for approval.

# DEVELOPMENT PROCESS (contd.)



# **INTERACTION WITH OTHER INTERNATIONAL ORGANIZATIONS**

The recommendations of international expert bodies, notably the International Commission on Radiological Protection (ICRP) and International Atomic Energy Agency (IAEA) are taken into account in developing the AERB Regulatory safety documents.

## INTERPRETATION OF THE TEXT

- **Safety related terms** are to be understood as defined in the AERB Safety Glossary.
- An **Appendix**, if included, is considered to form an **integral part** of the AERB Regulatory Safety Document. Material in an appendix has the same status as the body text.
- **Annexes and footnotes** to the main text, if included, are used to provide practical examples or **additional information** or explanation. Annexes and footnotes are not integral parts of the main text.

## **HISTORICAL PERSPECTIVE**

Requirements and guidance were envisaged for siting, design, operation, quality assurance, Civil engineering structures important to safety, radioactive waste management etc. of nuclear facilities, radiation processing facilities, industrial radiography, radiotherapy, nuclear medicine, diagnostic X-ray facilities, transport of radioactive material etc. and regulatory process.

Three safety codes on Design, Operation and QA for nuclear power plants and few safety codes and standards related to radiation facilities were developed initially during 1985-89.

## **HISTORICAL PERSPECTIVE (contd.)**

About 25 safety codes, standards and guides were developed by 2000

As of now about 160 documents are in place:

110 documents on NF

30 RF

10 IS

10 NRF



## **HISTORICAL PERSPECTIVE (contd.)**

Under siting series guidance was developed for dealing with atmospheric, hydrological and hydrogeological dispersion models, analysis of metrological parameters, analysis of inland and coastal floods, seismic analysis, population distribution requirements near nuclear power plant site, and siting considerations for emergency preparedness.

The siting code was revised based on current developments to include requirements with respect to design extension conditions, siting acceptance and rejection criteria etc.

## **HISTORICAL PERSPECTIVE (contd.)**

- Design safety code was revised in line with the international state of art and currently once again taken up for revision to strengthen defence-in-depth and treat design extension conditions.
- Design safety code was also developed for light water reactors.
- Another code is under preparation to deal with fast breeder reactors.

## **HISTORICAL PERSPECTIVE (contd.)**

Under design series guidance was given for safety qualification of systems, internally generated missiles, fire protection, design basis events, fuel, emergency core cooling system, safety systems, electrical systems, radiation protection, containment design, seismic qualification of structures and components, computer based safety systems in control systems, etc.

Guidance planned initially for subjects such as single failure criterion, irradiated components, materials, process etc. was later dropped.

New subjects such as deterministic safety analysis, severe accident management, hydrogen management etc. were being considered recently to provide guidance.

## HISTORICAL PERSPECTIVE (contd.)

The operation safety code was revised to include requirements for analysing operating experience feedback, PSA during operation, life management etc. Under operation series guidance was given for staffing and training, limiting conditions for operation, maintenance, in-service inspection, carrying out modifications in the plant, renewal of operation, operating experience feedback, life management etc.

AERB safety code on quality assurance was revised to **shift the focus from documentation to process**. Guidance provided for quality assurance during all stages of nuclear power plants is being extended to nuclear facilities and radiation facilities. Further revision of QA series is being considered to include roles of **leadership and management** and interaction with interested parties.

# New Concepts in Regulation of Nuclear Power Plants

- Harmonization of regulatory practices/requirements
- Focus from prevention of severe accidents to mitigation (new equipment to mitigate release from accidents)
- Substantive dialogue and discussion with stakeholders (in stead of informing public involving public) - Draft safety codes are placed on AERB website for public comments
- Focus on safety culture and organizing capabilities (recognizing vulnerability by weak safety culture in flawed organization)
- Focus on increasing awareness in use of radiation in radiation facilities
- Increased international cooperation with other regulatory bodies
- Participation in international experiments
- Involving academic institutions in safety research

# New Concepts in Regulation of Nuclear Power Plants (contd.)

- Site review and design review are proposed to be de-linked and can be reviewed independently (i.e. site review without project and project review without site) - Design-specific information can be reviewed to assess the suitability of site considering site-plant interaction.
- Human, organizational and Technological Factors are being elaborated.
- Safety enhancement related to extreme events (extreme storm, floods and earthquake) increase resilience of equipment to have greater margin - It is a challenge to define extreme external event parameter values.

## Enhancing Safety

- DiD approach is enhanced by strengthening level-4 by introduction of concept of 'Design Extension Conditions'.
- Design requirements for DECAs are not as stringent as those for SSCs identified for level 3 DiD (DBA)
- Coping time of SBO with dedicated Power Source.

## Enhancing Safety (contd.)

- Equipment Qualification for more 'Harse' environmental conditions for Extreme External events.
- Industrial Safety of NPP, under construction governed through Building and Other Constructions Workers (Regulation of Employment and Conditions of Service) Act, 1996, which necessities interface arrangement with agency responsible
- Setting probabilistic target for practical elimination of events.



## Operating Licence for Design Life

- AERB started issuing License for operation for the period of **5 years** since AE(RP)R, 2004 came into effect
- License is being renewed at every **5 years** based on the satisfactory review
- Subsequently, comprehensive Periodic Safety Review (PSR) is being carried out at every **10 years**
- Most of the IAEA member states issue operating license for the period of **30-40 years** and PSRs are carried out at every **10 years**
- Initial license for operation may be issued for **5 years**.

## Operating Licence for Design Life (Contd.)

- License for 'Regular Operation' for the remaining life (say **35 years**) is being proposed to be issued with the approval of the Board of AERB.
- PSR at every **10 years** would be continued.
- The renewal of operating license may be considered beyond 'Design Life' (say **40 years**) based on:
  - Detailed review of NPP operational history
  - Ageing related issues
  - Equipment qualification
  - Compliance to current standards

## New Concepts in Safety Regulation of Radiation Facilities

- Apply **graded approach** for existing radiation facilities or activities and exempt few practices from regulatory purview.
- For optimization of medical exposure, prescribe **diagnostic reference levels**, as in developed nations.
- Develop **common** Safety Code for all radiation facilities (RF), for consistency and harmonized approach on common requirements for all RF.

## New Concepts in Safety Regulation of Radiation Facilities

- Adopt **IAEA regulations** for safe transport of radioactive material, since transport is an international phenomenon harmonized throughout the globe.
- National Accreditation Board for Testing and Calibration Laboratories (NABL) is the body recognised by Government to accord accreditation. AERB initiated to **shift to NABL** for this purpose in a phased manner.
- Extending the scope of **Ethics Committee** for medical applications other than bio-medical research may be beneficial for protection of people.

## New Concepts in Safety Regulation of Radiation Facilities

- Use of X-ray based imaging technology to discover any **contraband object** inside the human body. AERB at present is approving such devices on case to case basis, however there is need to prepare detailed requirements.
- Provisions for protection of pregnant woman are prescribed in AERB regulations, however requirements for breast feeding woman are not addressed adequately.
- Exemption list prescribed by AERB covers limited radionuclides, whereas GSR Part 3 (Schedule I) lists all applicable radionuclides and other radiation sources/practice which may be exempted from regulatory control. AERB proposes to adopt Schedule I of GSR Part 3.

## New Concepts in Safety Regulation of Radiation Facilities

- Due to absence of safety culture in organisation, some of the operators chose short cut methods resulting in incidents/accidents. There is a need to give more **emphasis** on Management System and promote Safety Culture for protection of people and safety of sources.
- Periodic revision of radiation safety qualifications and syllabus for training with more focus on practical training and develop competency with advancement in technology.
- Emphasis on radiation safety awareness among all stakeholders and associated staff in RF.

**Thank you**