

Chapter 1: Introduction

1.1 Background

Radiation and radioactive substances have many beneficial applications, ranging from power generation to uses in medicine, industry and agriculture. At the same time, the risks of radiation that may arise from these applications to the people working in these fields, the general public and the environment are enormous and therefore, need to be assessed and controlled effectively. Regulating safety is a national responsibility. Since radiation risks can transcend national borders, international co-operation is essential to promote and enhance global safety by exchanging experiences as well as by improving capabilities for controlling hazards, preventing accidents, responding to emergencies and mitigating any harmful consequences.

Every country has an obligation to fulfill its national and international undertakings and obligations. International safety standards evolved over a period of nearly five decades provide support to countries in meeting their obligations under the general principles of international law.

1.2 Formation of the Atomic Energy Regulatory Board



The Atomic Energy Act, 1962 (AE Act) provides for the development, control and use of atomic energy for the welfare of the people of India and for other peaceful purposes as well as for matters connected therewith.

For safety reviews of the commissioning and operating activities of the Tarapur Atomic Power Station (TAPS) and Unit-1 of the Rajasthan Atomic Power Station, the Department of Atomic Energy (DAE) set up a Department of Atomic Energy Safety Review Committee (DAE-SRC) in 1972. The Committee's scope was enlarged (1975) to deal with major safety issues related to all DAE installations. In 1979, the Secretary, DAE constituted another Committee to study the existing terms of reference of the SRC, its functions, the modalities of reporting by the units as well as the impediments faced by it. The report of this Committee, submitted in 1981, was titled 'Reorganisation of Regulatory and Safety Functions'. It recommended the creation of an Atomic Energy Regulatory Board (AERB), with powers to lay down safety standards and assist DAE in framing rules and regulations for enforcing the regulatory and safety requirements envisaged under the AE Act.

Accordingly, AERB was set up in 1983, under Section 27 of the AE Act, which allowed the Central Government to delegate any power conferred or any duty imposed on it by this Act

to any officer or authority subordinate to the Central or State Government. The mandate of AERB was to carry out certain regulatory and safety functions envisaged under Sections 16, 17 and 23 of the AE Act. The relevant provisions are in *Annex 1*.

1.3 Functions of the Atomic Energy Regulatory Board

The functions and responsibilities of AERB are outlined below:

- to develop safety policies in nuclear, radiological and industrial safety areas.
- to develop safety codes, guides and standards for siting, designing, constructing, commissioning, operating and decommissioning different types of nuclear and radiation facilities.
- to grant consents for siting, constructing, commissioning, operating and decommissioning, after appropriate safety reviews and assessment, for establishment of nuclear and radiation facilities.
- to ensure compliance of the regulatory requirements prescribed by it during all stages of consenting through a system of review and assessment, regulatory inspections and enforcement.
- to prescribe the acceptance limits of radiation exposure for occupational workers and members of the public and approve acceptable limits of environmental releases of radioactive substances.
- to review the emergency preparedness plans for nuclear and radiation facilities and for transport of large radioactive sources, irradiated fuel and fissile material.
- to review the training programmes, qualifications and licensing policies for personnel of nuclear and radiation facilities and prescribe the syllabi for training of personnel in safety aspects at all levels.
- to take such steps as necessary to keep the public informed on major issues of radiological safety significance.
- to promote research and development efforts in the areas of safety.
- to maintain liaison with statutory bodies in the country as well as abroad regarding safety matters.

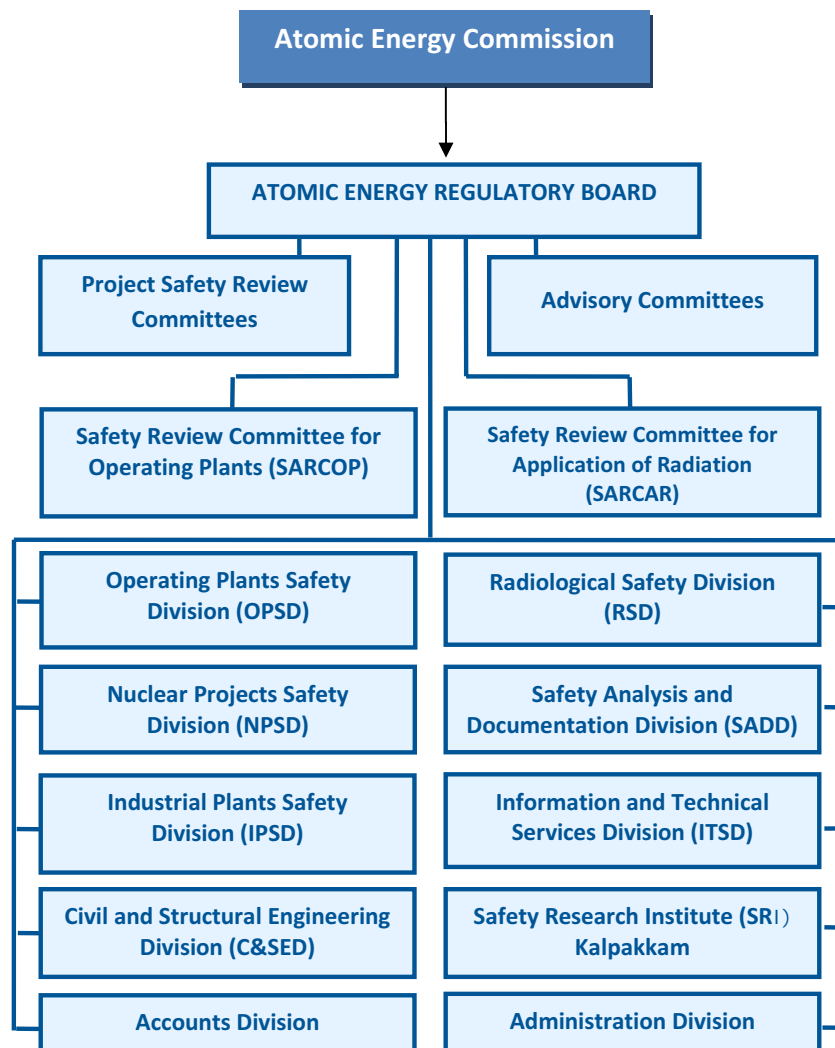
1.4 Constitution of the Board and its organisational structure

The Governing Board of AERB consists of a Chairman, four Members and a Secretary. The Chairman, Safety Review Committee for Operating Plants (SARCOP) of AERB, is also an ex-officio member of the Board. The Secretary of the Board is an employee of AERB. The Members of the Board are eminent serving or retired persons from the Government, academic institutions or national laboratories. The Chairman, AERB functions as the

executive head of the AERB Secretariat. The Board is responsible to the Atomic Energy Commission (AEC).

The Board is supported by two apex level committees viz. the Safety Review Committee for Operating Plants (SARCOP) and the Safety Review Committee for Application of Radiation (SARCAR) as well as by advisory committees, which are set up from time to time. SARCOP monitors and enforces safety regulations in nuclear power plants (NPPs) and other radiation facilities identified by the Central Government. SARCAR is the safety monitoring and advisory committee of AERB, which reviews safety aspects related to the application of radiation sources and equipment in industry, medicine, agriculture and research for non-DAE units as well as for transportation of radioactive materials in the public domain.

The organisational structure of AERB is as follows:



The staff of AERB mainly consists of technical and scientific experts in different areas of nuclear and radiation technology. Besides its own staff, AERB draws the required expertise from technical support organisations, academic institutions and retired experts.

1.5 Why we took up this performance audit

The national and international regulatory scenario and the criticality of the issue of radiation risks and safety prompted us to undertake a study of the structure and status of AERB as well as the effectiveness of its role as the nuclear regulator of India.

1.6 Audit objectives

The objectives of this performance audit were to examine:

- i. whether AERB has the necessary legal status, authority, independence and adequate mandate to fulfil the responsibilities expected of a nuclear regulator.
- ii. whether AERB, keeping in view the international recommendations and local requirements, has been able to develop safety policies in nuclear, radiological and industrial safety areas as well as safety codes, guides and standards for siting, designing, constructing, commissioning, operating and decommissioning different types of nuclear and radiation facilities.
- iii. whether AERB has been able to regulate nuclear and other radiation utilities through a system of consents effectively.
- iv. whether AERB has ensured compliance of the prescribed regulatory requirements by nuclear power plants, other nuclear facilities, and radiation facilities through a system of efficient regulatory inspection and enforcement.
- v. whether AERB is monitoring and discharging its responsibilities relating to radiation exposure to occupational workers and members of the public and release of radioactive substances in the environment in an efficient and effective manner.
- vi. whether emergency preparedness plans are in place for nuclear and radiation facilities and during transport of large radioactive sources, irradiated fuel and fissile material.
- vii. whether adequate and effective regulatory systems exist in the country for decommissioning of nuclear and radiation facilities and creation of decommissioning reserves.
- viii. whether the regulator has taken adequate measures for maintaining liaison with international bodies dealing with nuclear regulatory issues

1.7 Scope of audit

We reviewed the legal and regulatory framework of AERB and examined the prevailing management controls and administrative procedures connected with licensing, inspection and enforcement activities for the period 2005-06 to 2011-12. We reviewed the functioning of the emergency preparedness in selected NPPs¹ and districts².

Technical appropriateness of the analysis performed by AERB, technical capabilities of AERB staff and the appropriateness and effectiveness of the various procedures used were kept out of the scope of this performance audit. Nuclear and radiation-related activities of Bhabha Atomic Research Centre (BARC) installations, which were outside the purview of AERB, were also not covered in the performance audit.

1.8 Audit criteria

The criteria for this performance audit were derived from the following:

- The Atomic Energy Act, 1962
- Rules framed under the Atomic Energy Act, 1962
- AERB Constitution Order dated 15 November 1983
- IAEA Handbook, Safety Guide, Standards, Conventions, Manuals etc.
- AERB Safety Codes, Standards, Guides, Manuals, etc.

1.9 Audit methodology

We held an entry conference on 6 September 2010 with representatives of AERB, DAE, and other stakeholders to explain the audit objectives and approach. In principle, AERB agreed with the objectives and methodology adopted in this performance audit. The report was finalized, based on the responses received from AERB in February 2012 and the discussions held during the exit conference on 22 March 2012.

We scrutinised records relating to issue of consents, authorisations, licences, and regulatory inspections; minutes of various committee meetings; utility correspondence files; project reports, etc. during the period September to November 2010 and September to October 2011 at the offices of AERB, DAE, the Safety Research Institute, Kalpakkam and the Directorate of Radiation Safety, Thrissur.

¹ Tarapur Atomic Power Station (TAPS) – 1 & 2, Kaiga Generating Station – 1 & 2 and Madras Atomic Power Station

² Boisar, Karwar and Kancheepuram

We attempted a comparative study of the systems prevailing in AERB with the best practices available in other countries. For this purpose, we used literature available in the public domain, especially from the IAEA website and the websites of similar regulatory bodies in other countries.

We acknowledge the co-operation of AERB, DAE, Nuclear Power Corporation of India Ltd (NPCIL) and the Directorate of Radiation Safety (DRS), Thrissur.