

SETTING UP OF AERB

When Tarapur reactors built by GE, USA were ready for commissioning in 1969, there was no formal regulatory system yet, to approve the first approach to criticality. Sarabhai set up an independent committee under the chairmanship of A.K. Ganguly with members like N.Srinivasan and a few more officers from RED, BARC to review the commissioning activities at every step and advise him on the authorization of the next step. It was a challenging task for the committee, particularly because both the units of TAPS achieved criticality one after another within the same month. The same committee continued to review the safety of the plants during their operational phase too.

DAE Safety Review Committee (DAE-SRC)

When in 1971, Unit 1 of Rajasthan Atomic Power Station (RAPS-1) was getting ready for commissioning and operations, the existing committee for Tarapur was renamed as DAE Safety Review Committee (DAE-SRC) in February, 1972 and its scope was enlarged to include RAPS-1. In December, 1975 the scope of work of DAE-SRC was further enlarged entrusting it with the responsibility to deal with major safety policies and issues in all the constituent units of DAE. This included power reactors and research reactors as also all other fuel cycle facilities including UCIL, IREL, NFC, etc.

Recommendation to set up AERB

On July 23, 1979 Secretary, DAE constituted a Committee chaired by M.D. Karkhanawala, Chairman, DAE-SRC to study “the existing terms of reference of SRC, its functions, the modalities of reporting by the Units as well as the impediments faced by the Committee”. The review of the terms of reference and the working of DAE-SRC became necessary “to ensure that not only safety consciousness is

inculcated, but that safe practices prevail in all the Units of the DAE including the public sector undertakings". After the tragic demise of Karkhanawala in a car accident, V.N. Meckoni, the then Director, Chemical Group, BARC took over as the Chairman of this committee in February 1980.

The Committee discussed the functioning of SRC, role of SRC vis-à-vis that of a regulatory body, impediments in the functioning of SRC and the authority to be provided to SRC. It also considered creation of a regulatory body "to effectively fulfill the responsibility of DAE for regulatory and safety functions envisaged under Sections 16,17 and 23 of the Atomic Energy Act, 1962". The report provided a comprehensive review of the existing organizational arrangements to provide safety coverage.

Though the Committee did not observe any lacunae in the ways in which DAE-SRC had been discharging its assigned responsibility of safety review, it did make the following important observation. "Since the activities of DAE and use of radiation sources in the country have increased, it is considered necessary to establish a separate body with the responsibility to carry out the regulatory and safety functions in an effective manner".

In its Report titled "Reorganization of Regulatory and Safety Functions" (February 1981), the Committee recommended creation of Atomic Energy Regulatory Board by the Atomic Energy Commission with powers to lay down safety standards and assist DAE in framing rules and regulations for enforcing regulatory and safety requirements envisaged under the Atomic Energy Act 1962. The Committee also recommended that AERB should be a statutory body under the Act (if necessary by suitable amendment of the Act) to give AERB a legal basis. The Committee stated that in order to enable AERB to function effectively and exercise its authority in an independent manner it should be constituted by and reporting to the Atomic Energy Commission and should consist of senior persons from DAE as well

as external members. In this manner public confidence in nuclear safety matter would be enhanced.

The Committee described the scope of the activities of AERB and SRC, their composition, functions and powers, functions of design safety committees to be set up by AERB, functions of operational safety committees to be set up by SRC, functions of Health Physics Division and functions of the Division of Radiological Protection. The report also described the facilities to be extended to AERB.

The present functions of AERB are almost verbatim taken from the report of the committee. The Committee recommended that AERB should lay down and monitor the observance of safety standards for siting, design, construction, operation and decommissioning of nuclear and radiological facilities in the country. SRC should enforce the safety standards stipulated by AERB in the operating units of DAE and undertake safety surveillance as well as review of proposed changes in design and safety related incidents in the operating units.

Besides forwarding the minutes of its meetings to AERB, SRC was required to submit periodic reports on the safety status in the operating units of DAE to AERB. SRC should review deviations from the safety standards laid down by AERB and violations of the technical specifications for operations and should take prompt and necessary enforcement actions. "In case AERB finds that enforcement action in any particular case is not adequate, it may take up the matter with AEC" the committee clarified.

The committee's farsightedness is commendable. Its recommendations were to ensure that the right expertise is available for AERB for its functioning. It also reflected the need for the participation of experts from other regulatory agencies such as the Central Electricity Authority, Central Pollution Control Board, Ministry of Labour and academic institutions to gain from their expertise and experience.

AERB was set up on November 15, 1983. A separate notification indicating the functions and responsibilities of DAE-SRC was issued subsequently. AERB's functions included enforcement of provisions of radiological protection in the radiation installations outside the DAE. For non-DAE units, the AERB would be assisted by the Division of Radiological Protection, Bhabha Atomic Research Centre. Violations of safety standards laid down by AERB were subjected to further review by the AERB. Appeals against decisions of the AERB would be with the Atomic Energy Commission.

A.K.De, formerly Director, Indian Institute of Technology, Bombay, was appointed the first Chairman of AERB. P.N. Krishnamoorthy, formerly Deputy Director, Directorate of Radiation Protection was appointed Member-Secretary. The other Members of the Board were V.N. Meckoni, Chairman DAE-SRC, B.D. Gupta, Head of Radiation Oncology, Post Graduate Institute of Medical Education and Research Chandigarh and E.C. Subba Rao, Director, Tata Research Development & Design Centre, Pune.

As per the constitution of AERB, Chairman, AERB has the power of Competent Authority to enforce rules and regulations framed under the Atomic Energy Act for nuclear and radiation safety in the country. AERB also has the authority to administer the provisions of the Factories Act, 1948 for industrial safety in all the units of DAE. AERB has been delegated with powers to enforce some of the provisions of Environment Protection Act, 1986 in DAE installations.

Organizational Structure of AERB

AERB started its work with its office located at the Anushakti Bhavan (Old Yacht Club) in 1983. A. K. De joined in January 1984. The first Board meeting was held on March 10, 1984. A formal organizational structure of AERB was approved by the Board on September 5, 1985 and came into existence on September 30, 1985.

The main responsibilities of AERB include regulation of nuclear, radiation and industrial safety in DAE installations, radiation safety in non-DAE installations and preparation of regulatory documents. These were being carried out by three Divisions, namely Nuclear and Industrial Safety Division, Radiation Safety Division, Computer Facilities & Analysis Division. Besides these Divisions, there were two more sections, namely Safety Research Training & Publication Section and Library Services.

A Committee set up on March 21, 1987 again with V.N. Meckoni as Chairman reviewed the functions and responsibilities of AERB. The Committee submitted its recommendations on May 15, 1987. As recommended by the Committee, DAE-SRC became a part of AERB as AERB-SRC and later as Safety Review Committee for Operating Plants (AERB-SARCOP). The functions and responsibilities of AERB were broadened considerably. AERB started carrying out its functions as per the original notification and also as per the recommendations of the Meckoni Committee. Following this the Board had four divisions namely, Nuclear Safety Division, Industrial Safety Division, Operating Plants Safety Division and Radiation Safety Division.

AERB's office was shifted to Vikram Sarabhai Bhavan, Anushaktinagar in 1988. Subsequently, AERB shifted to its own office building named as Niyamak Bhavan in Anushaktinagar on August 2, 1996. Recognizing the need for an in-house R & D facility where dedicated research can be conducted on issues of regulatory interest, AERB commissioned its Safety Research Institute (SRI) at Kalpakkam in 1999. Due to considerable expansion of AERB staff over the years, a new office building 'Niyamak Bhavan-B' was constituted and occupied in November 2007.

The AERB secretariat now has eight technical divisions and their functions and responsibilities are as given below.

Operating Plants Safety Division (OPSD)

- Safety Review and Safety Surveillance including Health Physics Aspects and Emergency Preparedness of operating NPPs and Research Reactors
- Regulatory Inspection and Enforcement in respect of all operating NPPs and Research Reactors
- Conducting Periodic Safety Review and Renewal of Authorization
- Licensing of the operating personnel and the management staff
- Review of Physical Protection aspects in operating plants
- Enforcement of Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987
- Co-ordination with International Atomic Energy Agency (IAEA) for the International Nuclear Event Scale (INES) based reporting of events and for the Incident Reporting System (IRS) operated by IAEA/NEA
- Secretariat of SARCOP

Nuclear Projects Safety Division (NPSD)

- Safety Review of Nuclear Projects
- Regulatory Inspection & Enforcement in projects under construction
- Issue of authorizations at various stages of the projects as per established procedures and protocols
- Review of physical protection aspects in projects

Industrial Plants Safety Division (IPSD)

- Safety Review, Regulatory Inspection & Enforcement and Licensing of Personnel in respect of all DAE Industrial Plants and Projects and front-end Fuel Cycle Facilities
- Implementation of Atomic Energy (Factories) Rules, 1996 and Occupational Health Aspects in all DAE Facilities
- Implementation of Atomic Energy (Radiation Protection) Rules,

2004 in front-end Fuel Cycle Facilities, Accelerator Units and Beach Sand Minerals Processing Facilities

Radiological Safety Division (RSD)

- Licensing, Surveillance and Safety Review of BRIT facilities and Non-DAE Radiation Installations including Accelerators and Irradiators
- Implementation of Atomic Energy (Radiation Protection) Rules, 2004 and enforcement of Atomic Energy (Safe Disposal of Radioactive Waste) Rules, 1987 in non-DAE installations
- Ensuring safety in Transportation of Radioactive Material in public domain
- Secretariat for SARCAR (Safety Review Committee for Application of Radiation)

Civil and Structural Engineering Division (CSED)

- Safety Review pertaining to Civil and Structural Engineering aspects of nuclear reactors, fuel cycle facilities, industrial and radiation facilities of DAE.
- Site evaluation of nuclear facilities
- Developing civil engineering safety criteria for design, construction and erection of NPPs

Safety Analysis and Documentation Division (SADD)

- Safety Analysis and Safety Studies for nuclear facilities
- Preparation of Regulatory Documents
- Library and documentation services

Information & Technical Services Division (ITSD)

- Secretariat for AERB Board
- Activities to promote and fund Safety Research Projects
- International relations including interaction with other regulatory bodies
- Public information and Media interaction
- Compilation and publication of AERB Annual Reports

- Human Resource Development
- Response to parliament questions and queries under Right To Information Act
- Knowledge Management

Safety Research Institute (SRI), Kalpakkam

- Development of models, methodologies and knowledge base required for quantitative assessment of risks associated with the operation of nuclear fuel cycle facilities
- Generation / collection of data needed for safety assessment.
- Providing a technical forum for joint research among NPP personnel, research groups and regulators, in safety related fields.
- Organising regular programmes of technical meetings and training courses for different target groups on a variety of topics for enhancement of safety performance.

AERB Committees

AERB is supported in its functions by a number of committees. Members of all the AERB committees are recognized experts with long experience in the relevant fields and come from DAE units, various Governmental organizations, academic institutes and industry. A large number of retired experts are also members of the various AERB Committees.

Apex Safety Review Committees

The apex safety review committees of AERB are the Safety Review Committee for Operating Plants (SARCOP) and the Safety Review Committee for Applications of Radiation (SARCAR).

SARCOP was constituted in June, 1988 with M. S. R. Sarma, (Executive Director, Operating Plants Safety Division, AERB) as the first Chairman to evaluate and enforce nuclear, radiological and industrial safety in all operating units including public sector undertakings of

the Department of Atomic Energy, for ensuring safety of the operating personnel, members of the public and the environment. SARCOP is supported by a number of specialist committees such as the Standing Committee on Reactor Physics, Committee on Steam and Water Chemistry, Committee on Control & Instrumentation and Computer Systems and Expert Group on Coolant Channel Safety for detailed review of issues pertaining to specific technical fields. In addition, there is a unit safety committee for each operating unit (or a group of units) for detailed operational safety review of individual units and advising SARCOP.

In 1987, AERB constituted a Committee known as Licensing and Appellate Committee. This committee was restructured in 1991 with a new name as Safety Review Committee for Applications of Radiation (SARCAR) with a view to streamlining the implementation of Radiation Protection Rules in all practices and organizations using radioisotopes and radiation sources in medical, industrial and research institutes. A. Nagaratnam, former Director, Defense Laboratory, Jodhpur was the first Chairman of the SARCAR.

Apex Advisory Committees

AERB has constituted a number of Advisory Committees that deal with nuclear safety, radiological safety, industrial and fire safety, and occupational health. In addition, there are Advisory Committees for Safety review of various Projects (ACPSR) and Advisory Committees for assisting AERB in its safety documents development work.

The Advisory Committee on Nuclear Safety (ACNS) was constituted in January, 1985. J. C. Shah (Former Chairman, Atomic Power Authority) was the first Chairman of ACNS. The primary function of ACNS is to advise AERB on generic issues affecting the safety of nuclear installations including siting, design, construction, commissioning, operation and decommissioning. The Committee also reviews and makes final recommendations on the draft AERB safety

Codes, Guides and Manuals before they are put up to Chairman, AERB for approval. Similarly, the Advisory Committee on Radiological Safety (ACRS), Advisory Committee on Industrial and Fire Safety (ACIFS) and the Advisory Committee on Occupational Health (ACOH) advises AERB in the respective fields.

ACPSRs of various projects recommend to AERB issuance of authorization at different stages during siting, construction and commissioning of nuclear facilities including NPPs, after reviewing the submissions made by the plant authorities and based on the recommendations of the associated Project Design Safety Committees. AERB has constituted an Advisory Committee for preparation of Code & Guides on Governmental Organization for the Regulation of Nuclear & Radiation facilities (ACCGORN). There are also the Advisory Committees for Codes, Guides & Associated Manuals for Safety in Operation of NPPs (ACCGASO) and Safety in Design (ACCGD) as also the Advisory Committee for Safety Documents for Fuel Cycle Facilities (ACSDFCF).

Major Inputs by: *K.S. Parthasarathy and O.P. Singh*