SECTION 8

PUBLIC INFORMATION / AWARENESS PROGRAMMES

The staff of AERB continued to interact with professional associations, print and electronic media to publicize the regulatory activities of AERB. The Board issued several press releases on its activities.

8.1 PRESS RELEASES

The following press releases were issued:

1. Leakage at Tarapur Atomic Power Station (May 16, 2002)
2. AERB Issues Excavation Clearance for Prototype Fast Breeder Reactor (July 17, 2002)
3. Radioactive Source Missing in Transit (July 19, 2002)
4. AERB Rates Radiation Exposure Event at Level-2 (August 22, 2002)
5. Buy Only AERB Approved Medical X-ray Unit (September 20, 2002)
6. Safety Status of Indian Nuclear Power Plants (October 25, 2002)
7. Incident of Chemical Explosion at NFC (November 21, 2002)
8. Shri S.K. Sharma Appointed Vice Chairman, AERB (January 9, 2003)
9. AERB and Federal Nuclear and Radiation Safety Authority of Russia Sign Agreement (January 16, 2003)
10. Visit of USNRC Team to AERB (February 24, 2003)
11. AERB Industrial Safety Awards (March 20, 2003)

8.1.1 Leakage at Tarapur Atomic Power Station

A section of the press reported an incident of leakage of water from Unit-2 of Tarapur Atomic Power Station. This incident has no safety significance. There was no radioactive release into the environment. Three workers engaged in the repair and recovery work received radiation dose which exceeded the monthly limit by about 10%. But this is well within the annual dose limit.

AERB has provisionally rated the incident at Level 0 in the International Nuclear Events Scale. The International Nuclear Events Scale rates nuclear events on a scale of 1 to 7. Events with no safety significance are rated at Level-0.

The reactor was under re-fuelling shutdown. The leakage occurred on April 20, 2002. AERB had received and reviewed a detailed report on the incident. The leaked water was contained in the dry well and pumped back into the reactor.

8.1.2 AERB Issues Excavation Clearance for Prototype Fast Breeder Reactor

The Atomic Energy Regulatory Board has issued on July 13, 2002 excavation clearance for the 500 MWe Prototype Fast Breeder Reactor (PFBR) to be constructed at Indira Gandhi Centre for Atomic Research, Kalpakkam.

A nine-member Project Design Safety Committee and the Civil Engineering Safety Committee are assisting the Board in the safety review of the project. The Board had granted clearance to locate the PFBR at Kalpakkam on October 9, 2000.

8.1.3 Radioactive Source Missing in Transit

Radiographic Inspection Services, Kolkata has informed Atomic Energy Regulatory Board (AERB) that a gamma radiography camera (Amertest-660 Serial Number 5857) housing a radioactive source (Iridium-192 of strength19.7 Curies) was lost on July 17, 2002 while being transported from Lakhimpur to Digboi in Assam. A report has been lodged by the Company with the police and they have been requested to help in the search for the lost device on a priority basis.

The camera is a shielded container made of depleted uranium and weighs around 24 kg. It is a very sturdy equipment which cannot be easily tampered with and would not cause any significant hazard to persons so long as the source is inside the container. Depleted uranium is commonly used as a shielding material in radiography cameras. It also does not pose any radiological hazard.

A "Danger" warning sign along with radiation symbol is displayed on the device. AERB is coordinating with local authorities to locate the device containing the source.

8.1.4 AERB Rates Radiation Exposure Event at Level-2

The Atomic Energy Regulatory Board has rated an event in which a radiation worker was exposed above the regulatory limit at Level-2 in the International Nuclear Event Scale (INES) of the International Atomic Energy Agency. Levels at 1 to 3 are termed "incidents" and Levels at 4 to 7 are called "accidents".

The worker belonging to Quality Control and Inspection Section was performing radiography in the turbine auxiliary systems outside the reactor building of the Madras Atomic Power Station. He received a radiation exposure of 151 mSv when he was removing an exposed film and installing the new film. The annual dose limit for radiation workers prescribed by AERB is 30 mSv. Though the radiation exposure is unlikely to cause any significant harm to the individual, the worker has been taken out of radiation work as per the administrative procedure. AERB is viewing the incident seriously and investigations are under way.

A preliminary investigation has indicated that the exposure took place as the worker did not retract the source into the shielded remotely operable camera prior to replacing the film. The exposure occurred on July 24, 2002. It was noted later only after the processing of his personal dosimeter. The worker failed to use a direct reading survey meter which would have indicated the presence of radiation.

8.1.5 Buy Only AERB Approved Medical X-ray Unit

Among the man-made sources of ionizing radiation, diagnostic X-ray units are probably the most beneficial. An important step to improve radiological safety in X-ray installations is to use X-ray units, which have been type approved by the Atomic Energy Regulatory Board (AERB). Such units will have all the essential built-in-safety features.

Recently, AERB teams of scientists carrying out surprise inspections found that four companies located in four locations in the country are "manufacturing" X-ray units and selling them without getting their equipment type approved by AERB. AERB has already issued show cause notices to them. In one instance, AERB has suspended the marketing of its medical X-ray machines in the country.

Hospitals or individuals should buy only X-ray units which are "type approved" by AERB. The user should look for the type approval certificate in his own interest. Buying non-approved equipment may prove to be very expensive.

AERB has certified nearly 520 combinations of X-ray tubes, generators and couches made by 19 companies. The buyer should ensure that the equipment satisfies all the safety requirements prescribed by AERB. Displaying AERB type approval numbers on the X-ray unit is also a mandatory requirement.

Suppliers of imported X-ray equipment shall obtain a No Objection Certificate from AERB before marketing their equipment.

AERB may issue type approval / NOC only if the X-ray unit satisfies the safety specifications prescribed by AERB. Applications for these procedures are available at AERB web site (www.aerb.gov.in)

The manufacturers shall make available to the user detailed procedures for quality assurance tests, exposure charts, operating manuals and copies of AERB safety documents issued from time to time. According to the AERB Code the manufacturer/supplier should provide appropriate servicing and maintenance facilities during the useful lifetime of the X-ray machine.

Any person who employs radiation workers or who is self-employed as a radiation worker is ultimately responsible for ensuring radiation safety and availability of qualified personnel for operating X-ray equipment. The employer must provide personnel monitoring devices to the workers. The employer shall ensure that persons handling medical X-ray equipment abide by the provisions of AERB Safety Code.

The employer shall implement all safety measures stipulated by the Atomic Energy Regulatory Board. Texts of AERB Safety Code on Medical Diagnostic X-ray Equipment and Installations, Radiation Protection Rules and Radiation Surveillance Procedures for Medical Application of Radiation are available from AERB web site www.aerb.gov.in

8.1.6 Safety status of Indian Nuclear Power Plants

Recently, a section of the media quoted a report titled "Leaks at India's nuclear power plants: cause for concern" published in the Christian Science Monitor (October 11, 2002.). This report doesnot reflect the correct

safety status of nuclear power plants in India. It is biased and one sided and has used uncritically, a series of unsubstantiated statements of known and unnamed anti nuclear critics in India.

Over twenty months ago on February 20, 2001, while presiding over the inaugural session of the International Conference on Radiation Protection Dosimetry in Mumbai, Dr. S.P. Sukhatme, Chairman Atomic Energy Regulatory Board stated that the collective dose per GWe-Year to workers at the Kakrapar Atomic Power Station was over three times the best values in the world. Though the exposures are within the limits prescribed by AERB, he said that there is a clear need for reducing the exposures to workers.

Based on the reports on the conference, on July 6, 2002, the reporter of the Christian Science Monitor wanted to know the exact meaning of Dr. Sukhatme's statement. His other questions were whether there are some inherent design flaws in the Indian nuclear reactors and about the possible design improvements. Dr. Sukhatme sent the following response which is partly a running extract of the talk he gave at the Conference.

"Radiation exposures at nuclear power plants are subject to close scrutiny. Though the exposures are within the limits prescribed by Atomic Energy Regulatory Board, there is a clear need for reducing the exposure to workers. The collective dose in our power stations continues to be high. Rightly or wrongly, the collective dose per GWe-year produced is used as a bench mark parameter for international comparison. This parameter does have certain inherent limitations, which work against us because our reactors are of small size, all around 200 MW. Our best station in this respect is Kakrapar which has an average rate of about 7 Person-Sv per GWe-year. We will probably get better values at Kaiga. In contrast, the best values in the world are around 2 Person-Sv/GWe-year.

It is heartening to note that NPCIL has incorporated many design changes in the recent family of reactors to reduce radiation doses to workers and members of the public. Reducing the generation of Argon-41 is one of the important factors. Reducing the number of pumps in the primary heat transport system, improving the design of seals, and elimination of valves help to reduce leakage of heavy water which is the major source of airborne tritium which in turn leads to internal exposure of workers and also increased releases into the environment.

As you can see there are no design flaws in the PHWR design. However design improvements are possible and as mentioned, some have been implemented successfully."

Surprisingly, the reporter concluded that this "is a shocking admission that puts the rest of the country's nuclear power plants in grave perspective". We regret to note that he has been unduly influenced by anti nuclear critics in India and abroad.

The collective dose per unit electrical energy produced is one of the concepts used to compare reactors. It depends on the reactor size, age and type. If we examine the data over the past two decades, out of seven type of nuclear power reactors, a High Temperature Gas Cooled Reactor (HTGR) offered the lowest collective dose, whereas some Light Water-cooled Graphite moderated Reactors have clocked collective doses 80 times higher.

Even among the same type of reactors, significant variations in collective doses are found. For instance, even in Europe, the highest collective dose from a Boiling Water Reactor (BWR) in Netherland was 90 times higher than that in Finland.

The report incorrectly states that most of the fourteen Indian nuclear power reactors are modelled after Shippingfort reactor. Shippingport reactor was a Pressurised Water Reactor (PWR). Actually there is not even a single PWR in India. We have 12 Pressurized Heavy Water Reactors (PHWR) and two Boiling Water Reactors (BWR).

Apparently, the reporter is confused about safeguards and safety standards. His statement that three of the 14 reactors fall under International Atomic Energy Agency(IAEA) standards is incorrect. All reactors follow AERB safety standards which are on par with international safety standards.

Two reactors at Rajasthan (RAPS 1 & 2) and two reactors at Tarapur (TAPS 1 & 2) are under IAEA safeguards. That means the nuclear materials from these reactors are separately accounted for and verified regularly by IAEA inspectors. Safety and safeguards are different.

The reporter writes about the leaks in Indian nuclear power plants are of concern. There were instances of leaks in the nuclear power reactors. There are standard procedures to handle them. AERB analyses such incidents

and publishes their safety related details in the annual reports.

Radiation dose to workers in all nuclear power stations are well within the limits specified by AERB. Actually AERB stipulations on dose limits are in a way more conservative than those prescibed internationally. There is near total compliance with AERB stipulations by all nuclear power stations. For instance, during the year 2001, only 2 out of 13059 workers received doses above the limits.

The radioactive releases from nuclear power stations are closely monitored. They are also within the AERB limits.

AERB enforces international safety standards in all phases of the nuclear fuel cycle in India. Nuclear Power Corporation of India Limited (NPCIL) operates 14 reactors. Some of them, as in other countries, were built to earlier standards. The Board enforces the prescriptions of the International Atomic Energy Agency and ensures that appropriate safety upgradations are carried out by NPCIL.The Unit 1 of the Rajasthan Atomic Power Station is currently under shut down for upgradation as per the directive issued by AERB.

8.1.7 Incident of Chemical Explosion at NFC

On Sunday, the 17.11.2002 early morning around 0415 hrs, there was an incident of explosion in the thermo-syphon evaporator unit of Natural Uranium Oxide Fuel Plant (NUOFP) at Nuclear Fuel Complex (NFC) Hyderabad. There were no fatalities and no spread of radioactivity outside the plant premises, due to this incident.

Immediately following the notification of the incident by NFC authorities, Atomic Energy Regulatory Board sent a team of experts to NFC to make an on-the-spot assessment. A high level meeting convened in Mumbai on 20.11.2002, reviewed the situation with the expert team. Following detailed discussions, AERB has suspended the authorization for operation to the wet section of NUOFP, until further orders. AERB has also initiated a detailed inquiry into the incident.

8.1.8 Shri S.K. Sharma Appointed Vice Chairman, AERB

Shri S.K. Sharma has been appointed Vice Chairman and Member of the Atomic Energy Regulatory Board in place of Shri G.R. Srinivasan who superannuated on December 31, 2002. Prior to this he was the Director of the Reactor Group in BARC.

A graduate in chemical engineering from the Banaras Hindu University, Sharma has served BARC in different capacities from 1965 onwards. As Director, Reactor Group, he has been responsible for the overall supervision of the three research reactors Apsara, Cirus and Dhruva, at Trombay. He was also responsible for implementing three important plan projects. They are "Refurbishing of Cirus", "Critical facility for Advanced Heavy Water Reactor and 500 MWe Pressurised Heavy Water Reactors" and "Design modification and refurbishing of Apsara".

Shri Sharma has participated in the regulatory activities of AERB as Vice Chairman of the Safety Review Committee for Operating Plants and the Advisory Committee for Project Safety Review of Light Water Reactors. He has been a member of AERB Advisory Committee on Nuclear Safety. He has served IAEA as an expert in Tunisia, Korea and Egypt.

8.1.9 AERB and Federal Nuclear and Radiation Safety Authority of Russia Sign Agreement

Dr. S.P. Sukhatme, Chairman, Atomic Energy Regulatory Board and Dr. Yuri Vishnevskiy, Chairman, Federal Nuclear and Radiation Safety Authority of Russia have signed an agreement on January 15, 2003 for cooperation in the field of safety regulation in the peaceful uses of nuclear energy. The regulatory agencies have agreed to familiarize themselves with the practices followed by them to ensure the safety of nuclear power plant personnel and the public and protection of the environment against any possible harmful effects of radiation.

The agreement proceeded from the understanding reached between the erstwhile Union of Soviet Socialist Republics and the Republic of India on November 20, 1988 and the Supplement to the Inter-Governmental Agreement dated June 21, 1998 to set up two 1000 MWe Russian nuclear power reactors at Kudankulam in Tamil Nadu.

Mutual exchange of information and experience will cover regulatory documents used for the design and for all subsequent phases of the nuclear power project, methodology adopted to validate computer codes and comparison of results against international verification programmes and requirements for qualifications, training and licensing of power plant personnel. Method of

acceptance of design and its analysis with regard to seismic stability and environmental qualification, methodology of selection of materials for critical components, regulatory positions on other matters related to the safety of nuclear power plants are some of the other issues where AERB and the Russian regulatory authority will exchange information and experience.

The present agreement came into force from January 15, 2003 and is valid up to the beginning of regular operation of the nuclear power plant at Kudankulam.

8.1.10 Visit of USNRC Team to AERB

On invitation from Prof. S.P. Sukhatme, Chairman, Atomic Energy Regulatory Board (AERB), Dr Richard A. Meserve, Chairman, United States Nuclear Regulatory Commission (USNRC) visited AERB today. He was accompanied by a 15 member team. The officials from AERB and NRC discussed several safety-related topics of mutual interest. These included fire safety, emergency operating procedures, design issues, risk informed performance based regulatory procedures, licence renewal and periodic safety review.

8.1.11 AERB Industrial Safety Awards

Prof. A.K. De, former Chairman, Atomic Energy Regulatory Board (AERB) presented the AERB Industrial Safety Awards for 2002 to Narora Atomic Power Station and Heavy Water Plant Tuticorin in the category of nuclear power plants and heavy water plants and to Indian Rare Earths Ltd., Manavalakurichi in the category of other production units at a simple function held at AERB Auditorium on March 20, 2003.

On this occasion, Prof. S.P. Sukhatme, Chairman, AERB released a booklet entitled "Industrial Safety Statistics of the Department of Atomic Energy (DAE) Units for the year 2002". The booklet contains data to analyse and compare the injury statistics amongst different units of DAE and also those (collected from Labour Statistics Publications) among similar units outside DAE.

Safety status of DAE Units is found to be higher than that in comparable units outside DAE.

Lost time injuries (injury causing death or disablement for 48 hours or more) in all DAE Units under the jurisdiction of AERB were 143 in 2002 and have shown a decreasing trend over the years (243 in 1999, 211 in 2000 and 172 in 2001). Fall from height, fall of object and struck by object are the major reasons for the injuries. The Atomic Power Stations at Tarapur, Narora and Kaiga and Heavy Water Plants at Hazira and Tuticorin achieved the distinction of no injuries in 2002. Heavy Water Plant at Tuticorin clocked another distinction; it has the longest accident free period of 3681 days.

8.2 INTERVIEWS WITH PRESS

Dr. K.S. Parthasarathy, Secretary, AERB and Director, Information and Technical Services Division was interviewed by Newspapers and News Agencies. The interviews covered various safety related activities of AERB.

1. N-medicine units are violating safety norms, The Times of India April 25, 2002.
2. Leakage at Tarapur Atomic Power Station insignificant, PTI on May 16, 2002.
3. AERB warns against indiscriminate CT scan – The Deccan Herald on June 5, 2002.
4. Radioactive camera was found in a bus, The Indian Express, July 20, 2002.
5. Radioactive camera lost in transit, The Telegraph, July 18, 2002.
6. Radioactive camera missing in Assam, United News of India, July 17, 2002.
7. MAPS worker exposed to radiation is kept out of work site, Press Trust of India, August 22, 2002.
8. AERB to probe radiation exposure at Kalpakkam, The Hindu, August 20, 2002.
9. Atomic Board refutes media reports, The Hindu, October 26, 2002.
10. Safety standards high in nuclear plants – AERB, The Deccan Herald, October 26, 2002.
11. AERB denies reports terming India's n-reactors as unsafe, Press Trust of India, October 26, 2002.
12. Radiation dose to employees within limits – AERB, October 24, 2002.
13. AERB train customs officials to handle radioactive material, The Indian Express, November 16, 2002.

8.3 AERB NEWSLETTER

AERB published two newsletters:

i) Vol.14, Nos. 1-4 on October, 2002.

ii) Vol.15, Nos. 1-4 on January, 2003.

The publications covered the activities of the Board including authorisations issued and regulatory restrictions imposed on various installations. The newsletters also included articles on Probability Safety Analysis and Safety in the Transport of Radioactive Materials.

8.4 LECTURES ON ALL INDIA RADIO

Dr. K.S. Parthasarathy delivered a series of nine lectures on the activities of AERB on All India Radio Samvadita Channel Mumbai A .

The following topics were covered:

1. Nuclear and radiological safety in India (December 1, 2002 and December 8, 2002)
2. Medical X-rays : A note of caution (February 7, 2003)
3. Radiation processing of food (February 14, 2003)
4. Nuclear radiation, myths and the reality (February 21, 2003)
5. Medical physics in cancer treatment (February 28, 2003)
6. Why radiological safety? (March 7, 2003)
7. Safe uses of radiation in research applications (March 14, 2003)
8. Radiological safety in the medical applications of radiation (March 21, 2003)
9. Safe uses of radiation in industry (March 28, 2003)

8.5 AERB WEB SITE

The AERB website www.aerb.gov.in continued to disseminate information on AERB. The information published on the site included press releases, Annual Report, AERB Newsletter, a list of publications, composition of the Board and its important committees. The texts of the Atomic Energy Act 1962 and the safety related rules and some of the AERB safety codes are available on the site. AERB site also includes the format of applications related to its safety research programmes and that of applications pertaining to type approval of radiation equipment, approval of radiological safety officers among others.