Appendix

Excerpts of speeches and messages

Dr. Anil Kakodkar
Chairman, AEC

I think it is a great day and I want to begin by expressing gratitude to all the stalwarts who are sitting on the dais and in the audience for shaping this great organization and taking it to the present strength. My compliments and greetings to you all.

On this day, I distinctly remember (not that I was directly involved in it but have witnessed it on the sidelines) about the fair bit of debate, the brainstorming that was taking place in those days. I know Mr. Soman was in the thick of it. But, it was Dr. Ganguly, who was the anchor and who all along emphasized the scientific and technical orientation to safety regulation and laid a firm philosophical base in this regard while piloting the transformation to an independent regulator through an informed debate. I must salute to all those people who were involved in those brainstorming and facilitated the transition from the "internal safety committee structure to a fully independent Atomic Energy Regulatory Board".

I want to share a happening (where I was involved in) just to highlight the importance of the presence of wise men in a regulatory system. I think this is the main distinction between Atomic Energy Regulatory Board as a regulator and the very large number of other regulatory agencies that we have in the country. I also remember that recently at a very high level discussion, some of those regulatory systems have in fact been characterized rather sarcastically as dispute resolution mechanisms. I also remember that AERB has been a model which people have been quoting for emulation whenever there has been a thought of establishing a good regulator. Report of Professor Swaminathan is a case in point. AERB has lived up to what Dr. Bhabha used to say (in the context of radiation protection) that in whatever we do, we must do in a manner that the whole country may want to emulate. You can't have a better example than AERB coming of age. So, I think it's a moment that all of

us feel very proud and I want to compliment every member of Atomic energy Regulatory Board on this occasion.

Coming back to the spirit of wise men, I want to tell you an episode which I was myself a witness with Dr. Ganguly. And this was at the time when the concepts of Dhruva were being hotly debated. There were huge arguments with groups taking sides on whether it should be full tank concept or a partial tank concept. I was still an outsider and when I was asked to join the Dhruva project, it looked to me that BARC was vertically divided because of this controversy. The question was how to convince people that whatever is being proposed is right. It was Shri Seshadri's idea, to go to Dr. A.K. Ganguly. We took an appointment. There were only three of us in the room. Seshadri told Dr. Ganguly "I want to apprise you with what we are wanting to propose". Dr. Ganguly replied back "you want to brainwash me". Seshadri said "no, we can't brain wash you, we just want to tell you our view point" to which Dr. Ganguly said "ok, you can tell but that does not mean that I will side with you". He gave a patient hearing which lasted a couple of hours. Sheshadri did his part and then I did my part. And at the end of it, Dr. Ganguly said "ok, you told me so many things, I have heard them all but I want to forget all that". He then looked at Seshadri and asked "how confident are you?" Seshadri said "hundred percent". He looked at me and asked "how confident are you?" and I said "hundred percent". Finally, he asked us to leave. And of course the discussions in safety committees and all other parts of the process did take place, and proper decisions followed. I am not saying that you regulate by looking at people and asking their confidence but I am only wanting to refer to the insights of wise men. AERB has been particularly fortunate that we have wise men conducting the affairs of AERB and so we are in this stage.

I think the point made by Prof. Sukhatme and many others in the context of knowledge base and human resource base are very crucial. Wisdom comes a little after we acquire knowledge. You can't be wise unless you have knowledge. Strong knowledge base on part of people who are involved in regulation is a fundamental prerequisite. Otherwise you end up in what happens in many other regulatory systems. You first

have an Act of the Government, you set up certain rules under the Act which are placed in the Parliament. And then any clerk can put a finger on the rule and say that this can be allowed or not allowed. And that unfortunately happens in many places. It is the higher level understanding and enlightened way of dealing with things, of course consistent with rules, is what's important. Rules are a must and conformance with the rules also is a must but then you can't become slave to the rules. The importance of greater inhouse competence, knowledge driven ambience cannot be under emphasized. It is also important because it's only this knowledge base which will allow you to make sure that you are no longer close to the cliff edge. I think this is extremely important in safety regulation. There are many instances where you can meet all rules, all requirements and yet could be very close to the cliff edge and the slightest departure from normal can be a catastrophe. And this is where existence of research insights and holistic understanding of the system is important.

All of us are aware that we are now at a turning point. The turning point where we expect the rate of growth to be much higher than what it has been before. The rate of growth will be higher not in terms of just megawatts but also in terms of the range of technologies that we need to handle. I think this is a major challenge before us. When we talk the technology which has been already practiced somewhere else, then obviously you also have some information and background about the technology, the knowledge base for the technology and also the regulatory view about the technology. But I think we are fast entering a new situation where we are talking of fast reactors. Not many countries have fast reactors. Very soon we will talk about fast reactors of a very different kind. We have our own interest in thorium. We are talking about systems which will be coupled accelerators and reactors and so on and so forth. And I think all these things will happen surely within the next decade. We will be faced with the challenge of regulating systems which do not exist anywhere. The challenge before us now is how to ensure safety in the context of such evolutions. And mind you, this is not unique to India. Even abroad, there are major initiatives in terms of generation IV reactors. These are different concepts, which are being worked out

and obviously the safety of all these concepts have to be understood world over. But, we would be talking of the concepts which are not quite the same as those developed else where. One of the principal tenants of safety regulation is so called 'proven on experience'. If you have prior experience, we obviously have greater confidence in terms of safety assurance. Now we have to evolve new innovative systems, because we can't remain with just 10,000 MWe. that we want to reach with PHWRs. 10,000 MWe will be reached inspite of the uranium shortages. But we cannot restrict ourselves to just 10,000 MWe because if the goal of atomic energy is just 10,000 MWe, then I think atomic energy may not even have existed. 10,000 MWe is too small as far as the requirements of this country are concerned. And so I think that it is absolutely inevitable that we now move on a path where we might not have the benefit of learning from experience of others. However, we have to make sure that there is absolutely no compromise as far as safety regulation is concerned. And I think that again underscores the spirit of those pioneers like Dr. Ganguly. I think we are likely to go through a second revolution in terms of safety regulation because of these changes. It is important that AERB within its silver jubilee year does get into a lot of discussion on how to organize ourselves for meeting this new challenge.

I must tell you at this stage that AERB commands a huge respect outside. Some years ago in Vienna, we had a meeting with the US. In that meeting, Chairman of USNRC was talking about the AERB-NRC co-operation which has been ongoing and the very positive impression he has had on the development that has taken place as the part of the cooperation and the respect the USNRC has for the Atomic Energy Regulatory Board. In fact, he went on to say that there were elements in Indian Programme from which they thought they could learn. This is a major statement and he did say that in a formal meting. So, I think we have every reason to be proud of. AERB has shaped itself to come to present stage. It can certainly shape itself into being a vibrant regulatory organization to take on the new challenges of regulating the new technology developments. After all when the fission reactor started, this is the way it had gone on in many other countries. And so I have no doubt that given the strong capability and the will we would also be in

a position to do so.

Now that brings me to yet another way of looking at this matter. We of course have to have the codes, standards, we have to have requisite procedures for reviewing safety. Now the question is when it comes to details, it has to be specific. And so PHWR regulation and fast reactor regulation for example, have to have their own specific special elements. But then in terms of assuring safety, there are some fundamentals and whichever technology one is talking about, we still respect those fundamentals. I think at the top level this is something which is very clearly being done. But I think time has come when one should also address this issue of being able to regulate in a technology independent manner. I know there are practical difficulties when it comes to details. But surely there must be a way of spelling out the safety requirements in a manner which are technologically independent. It may seem little difficult to begin with, but if you don't do that then we may face a situation of wheels within wheels where we are handling several technologies simultaneously. Today we are doing regulation with a few licensees and they are inhouse organizations like NPC, BHAVINI and other units. But tomorrow when it comes to private entities, they will surely put finger on the written rules. At that point of time, one way would be to have detailed standards laid down for all technologies well before we get their regulation or other way is to be able to do it in a manner which is technologically independent but still be able to carry out the detailed process, meeting all the requirements. I know it is very easy to say all this than actually do it. But it looks to me that this is bound to be of significant importance sooner than later.

There is another area which I think I must highlight and may be this could become an agenda for brainstorming during the silver jubilee year of AERB. It relates to the standards. There are, of course, safety standards and AERB has done wonderful work in that field. But there are also the industry standards. It is important that there is a strong indigenous standardization process as far as industry standard is concerned. I am a firm believer of the fact that industry standards are better done by the professional societies rather than by the Government or by the regulatory

body. It is necessary to launch that activity with all seriousness. There are some industry standards which are available. ASME codes for example which are undisputed. There may be others which can be adopted as has been already done. But I think if you want to really pilot an Indian Nuclear Industry where we promote maximization of value addition within our country then we need to have a much broader framework of industry standards and we need to mobilize the professional societies; of course the Indian Nuclear Society certainly can be one important platform but there could be others. Otherwise you would get into the confusion of overlapping responsibilities. I thought I will just leave this thought for your consideration as an agenda for the silver jubilee year brainstorming.

And the last point is, of course, on the regulatory ethics and I wholeheartedly complement AERB for bringing out this document. I think just as when we say, charity begins at home, the culture begins at home, so also ethics begin at home. And I think it's a great job that all of you have done. I think when it comes to ethics, it is also important that we are aware that the ethics are the part of the way the society evolves. We can interpret that in our own context. Traditions are very important. Somehow I feel that there is strong relationship between good traditions and good ethics. I think while we must evolve, and must adapt to the changing circumstances, there is some value about the good traditions that we have and there is a lot of importance to building on the foundations of those good traditions as a society and as an organization. And it is only then we can really put good ethics into practice. Otherwise ethics will remain in the booklet for the purpose of showing it to others.

I must conclude now. I think it's a great day. I once again congratulate all of you and let me reemphasize my gratitude to all the wise men who are sitting here for showing us this day and we look forward to another twenty five years of glorious achievements, lets say that in advance. Thank you.

Prof. A. K. De,
Former Chairman, AERB

AERB was constituted in November 1983. One day Dr. Raja Ramanna, the then Chairman, AEC called me up sometime in the middle of December. He was then Chairman, Board of Governors, IIT Bombay and so he knew me well and my capabilities. He invited me to become Chairman of the newly created AERB.

I did not know much about AERB. I was with IIT, so I knew about teaching; I was in research institutes, so I knew about research activities. I was in industry also before I joined IIT Bombay, so I knew how to run an industry, but I had no experience in regulatory practices. But he (Dr. Raja Ramanna) told me to join saying "you have all the experiences and people over here will assist you, don't worry". He was IIT Chairman, so how can I say no to him.

When I joined AERB in January 1984, there were only two people: Mr P.N. Krishnamoorthy, the member-secretary and myself. We had our office in Anushakti Bhavan for sometime. Then we moved to the Old Yacht Club (OYC) building. Subsequently, we went to Vikram Sarabhai Bhavan and now AERB has its own independent building.

Only after joining AERB, I came to know about the existence of DAE Safety Review Committee (DAE-SRC) and functioning under Chairman, AEC and this continued even after the creation of AERB. In that case what are we supposed to do? Initially there was much confusion, many anxious moments and much of suspense. Dr. Ramanna's simple logic was that "DAE-SRC is doing a fine job. Let it continue its work. AERB should concentrate on radiation safety issues connected with medical and industrial applications". Frankly speaking, it gave me a rude shock.

Matters however, needed to be sorted out and functions well-defined. We started working for the preparation of Safety Codes, Guides and

Standards. It took sometime to re-organise ourselves. I was told much later by Dr. K. S. Parthasarthy, the then Secretary, AERB that this was not very unusual and even when USNRC was first formed, there were similar problems. When you have power in your hand, you don't want to give it up easily and lose control over it. I imagined time will take care of it and all such inconsistencies will be removed soon.

Ultimately, SRC which was acting as an independent unit, came under AERB and DAE-SRC was disbanded. AERB started with six scientific personnel. We had to search for experienced people specially in the field of civil engineering design and construction. I was lucky to recruit Dr. P.C. Basu, a proficient Civil Engineer from the open market. I am glad to see that Dr. Basu and his group are playing an important role in AERB.

AERB selected people mostly from BARC and NPC. But we tried to re-orient them and develop a new mindset in them for the safety mission. We explained to them that regulation is different from operation and they will have to give special emphasis on public safety. Public should have confidence and trust in them. I am happy to see the huge expansion that has taken place in AERB in terms of both scientific personnel and also the number of activities.

India today is on the fast track of economic growth (9% GDP) and development. I think our electrical energy demand should grow at least by 10-12% every year for the next few decades. Today the effect of green house gases on global warming and climate change has captured the attention of all countries in the world. Nuclear energy does not emit any green house gases and has an edge over other alternative source of energy.

In 1985, I visited a nuclear power plant in France near Paris. At that time there was a dispute going on at TAPS regarding the safe distance of its outer boundary. When I visited this plant in France, I noticed a fine cluster of houses (almost a small township) well within the outer boundary of 1.6 km. I was asking how that

was possible. The French official explained to me "today we are having about 75% of electrical energy from nuclear sources and this has become possible because both the government as well as the people have accepted this as a primary source of energy. People feel safe with nuclear energy" France does not possess oil, coal or even uranium fuel. Nuclear energy, therefore, suits the country best.

In such matters, transparency is very important in our thoughts and actions. In India we at times want to keep things under a veil of secrecy. I was prevented in 1984 to take part in a discussion over nuclear issues. I could not call press people and talk to them. However, things changed slowly. I could do that in 1987 when I was appointed for the second time as Chairman. I met the press people and told them what we are and what we are doing at AERB.

One very important practice that the French Government was following was through a procedure called "Public Hearing". Many doubts about safety issues were removed through such dialogues. The public in France has full trust and confidence in government dealings with nuclear energy. I feel we will have to create such public confidence in our people about nuclear energy; we will have to ponder over it very seriously.

Nuclear energy, no doubt deals with dangerous and radioactive materials. Some radioactive fallout/radioactive leakages may take place but that should not go into the public domain. During my Chairmanship many professional people often asked me "Do you think, we are safe with nuclear energy?". AERB conducted an opinion poll-survey in 1987 about the common man's perception about nuclear energy through a questionnaire amongst the students, staff and faculty at TISS. Many of them had vague ideas about nuclear energy, its potentials and other effects.

It seems to me that we should go out and tell the people as the French Government is doing or even the Japanese Government is doing now.

Japan today has 30% of its energy share from nuclear sources and they are planning to reach 60% during the next few decades (a country that was ravaged by the nuclear holocaust). The Regulatory Body is not a promoter for nuclear energy. A utility would build nuclear plants but a regulator would approve its operation subject to regulatory procedures keeping public safety as its primary focus.

At one time we were proud to say that our control room operators are all graduate engineers whereas the USA employs mostly class twelve year school pass-outs. It is very important that people must be well trained but integrity should be one of the important characteristics of people. When one looks at AERB logo, probably notices that people here are attempting to protect people from dangers of radiation damage. When people have complete confidence in you, then there is nothing wrong in going for nuclear energy.

The country is producing at present only about 3% of the total electrical energy from nuclear sources. Many other countries have gone far ahead of us. We have enough of intelligent and competent people in the country to shoulder the complicated problems of nuclear reactor design, construction, operation and also of regulation.

In 1988, I led a team of nuclear experts to the then Soviet Union to understand and discuss the various safety issues of a new reactor design fitted with some novel safety features. The new reactor was proposed to be set up at Kudankulam. Dr. Kakodkar (present Chairman, AEC) was also a member of the team. We had very detailed discussions and with many probing questions from the Indian side. At the end of the meeting one member from the Soviet side remarked thus: "We have many visitors from abroad and discussing with us on our nuclear plants but this is the first time ever we have come across a team of experts from India who have asked so many searching questions on the safety issues of our reactor".

International Atomic Energy Agency has predicted that India would

need about 40GW of electrical energy by 2030. DAE, I understand, has a plan for nuclear energy to reach from the present 4,000 MWe to 40,000 MWe, by that time. This would, no doubt, be a very big jump. What is needed is a strong political will and a drive to garner all the resources at our command to achieve the goal. AERB has to play a very important role in this expansion programme, as it is the ultimate lynch pin on all safety issues.

I wish Mr Sharma, Chairman, AERB and his Scientific and Technical Staff all success in their endeavor; a glorious and bright future is awaiting you.

Shri. S. D. Soman
Former Chairman, AERB

I am glad to hear about the current activities and the future plans and also that good amount of effort is being put in for human resource development. One thing I would suggest that the training programmes have to be lot more broad based because regulatory body has to regulate from mine upto waste disposal. All these activities have to be covered in a program at appropriate level. In fact I had a benefit as Head HPD, BARC as I was associated with all these things activities since the health physics units were located at all these places. I had to go and see their safety things, so I didn't have any problem. But with the newer people coming, I think this is one thing which AERB should keep in mind in its training programmes.

Transparency, is again very much necessary. One of the things which I had started was every year I used to have a press conference when the annual reports came up. Give it to the press people, let them ask questions while all the members of the Board should be on the dais and they should be answerable to the questions. So programmes about the involvement of the people and the agency, which reflects the voice of the people, should be carried out. I note that in recent years this has sort of diminished.

Another challenge that AERB will face in the coming years is the participation of the private industry as the civilian nuclear cooperation programme is coming up. So far only government (public sector) agencies were involved in the nuclear power development but with the private people coming in, I think the regulatory activity will have to be much sharper and time bound to meet the private utilities' need. I am sure this can be done and it will have to be done if we have to take advantage of the activities, which are envisaged as a part of this civilian nuclear cooperation programme.

It is very important to remember that the operator and the designer

of the facility are much more knowledgeable than the regulator and the regulatory people must give enough weightage to it and also should benefit from it. That's how, infact I was able to pick up people (like Shri S.V.Kumar, former Vice Chairman, AERB) and bring them to AERB. These people knew the things and at the same time have the safety culture and will be free to criticize their own facility from safety point of view. So this is again important. Regulatory body is like an external auditor but the people who are managing are those who were in the operation of the plant, designing of the plant etc. They knew much better than the regulatory people. As regulator, we can only do the spot checks.

I'm glad that the Regulatory Board has brought out number of documents which sort of make out the framework within which the operator or the licensee has to function; it could be design, it could be operation, it could be any other thing. AERB has very much benefited from the activities of IAEA. In fact we have a programme which is similar to IAEA programme on codes and guides. One thing, at least in my time, which I had a difficulty was just as IAEA had codes and guides for governmental organization, what could be the parallel of that in AERB's codes and guides. But I am glad that AERB has come out with that and brought some guides and codes in that area also.

One of the things to which probably more importance should be given is emergency preparedness. Now fortunately incidents or events etc are very few and minor. But that should not slacken the operator or the regulatory people on how one can handle actual emergency situations. This was one of the important things that was taken up by the government after the Chernobyl incident and in fact no new power stations were approved till government was satisfied with the emergency preparedness documents, drills which were being carried out and the whole mechanism. We should not allow it to slacken.

Well I wish Regulatory Board more and more successes and heights to attain in the coming years. When I took over, AERB was 6-7 years old child and it's nice to see now that it has grown to 25 years. Wish you all greater successes in the future.

Prof. P. Rama Rao
Former Chairman, AERB

My greetings to all of you and many happy returns of the day. Anniversaries are very happy occasions. They are also occasions when one is tempted to revisit the past nostalgically. But then memories always tend to fade, more so when one is ageing as I am. Still let me try and recall a few events. Some of these are personal to me and I crave your indulgence.

I was winding down at the Department of Science & Technology, New Delhi and I did not wish to continue in an administrative position. So I returned to DRDO and I was placed in Sena Bhavan, New Delhi. It was at this time that I received a phone call from Dr Raja Ramanna. In his capacity as Chairman of the Search and Selection Committee, he wanted me to take over as Chairman, AERB. I was not inclined to moving into another desk job. Moreover I was not sure what the assignment called for. So I pleaded with Dr Ramanna to excuse me. Not willing to take a 'no' from me, he shot back, "you can't say no to me over the phone; at least say that you will come and talk to me". I agreed to see him and ended up at AERB.

I had then a fair acquaintance of the DAE activities. I had some friends in metallurgy. My first encounter with the department goes back to the late fifties. I was at the Indian Institute of Science, Bangalore as a research scholar and I was carrying out research on X-ray diffuse scattering. At OYC, Dr Brahm Prakash, Head Metallurgy Programme and his group had acquired an X-ray diffractometer which I was permitted to use for my studies. During that period I got to know more about the metallurgy program and also made new friends. Dr. R. Chidambaram and I were long-standing friends. Because of him and Shri C.V. Sundaram and their colleagues, I subsequently used to visit the department to participate in the selection and promotion committees. Beyond these, I cannot say that I knew much about DAE or for that matter AERB. However, when

I entered the portals of this then new, elegant building, I felt instantly comfortable and the credit for this feeling entirely belongs to the staff and scientists at AERB. Once I settled down here, experts, who were members of the safety committees, dropped in to talk to me about technical matters and it was a pleasure as well as was educative. With a scholar like S.V. Kumar around, the learning experience became even more pleasant.

One visitor to my office, who made an indelible impression on me was Dr Ramanaiah. He telephoned me first and then came over to my office. He was immaculately dressed. He spent more than an hour with me and enlightened me on my role as a regulatory authority in a strategic department such as DAE. Little did I know that he was gravely ill. A few days later, it was heartrending to learn that he had passed away. This meeting, more than anything else, made me appreciate how uniquely fortunate the department was in the way it perennially commanded loyalty from its employees.

I also vividly recall my first tutorial on the operation of a power reactor during the train journey to Rawatbhatta. The reactor had some difficulty with the over pressure relief device, OPRD. I had requested Ch Surendar to accompany me. During the journey, he explained quite a lot about the reactor and the problem with the OPRD. The kind of professional in-depth knowledge he had of the design, the technology and the materials was astounding. This was also true of Sanath Kumar who had designed and built the fuelling machine. I can mention more names but we do not have the time to do so on this occasion.

When a person like me who has moved around in this country in various fields comes here, he can make certain observations of his own. Let me point out to two of these.

The DAE is exceptional in having built a multi-disciplinary development programme covering a vast spectrum of difficult areas all the way from exploration of minerals to operating commercial power

reactors. I do not have to tell this audience what challenges figure in between these end points. Besides, areas of societal need have received attention. It was heartening to see this feature evident recently at Hyderabad when the Indian Nuclear Society felicitated Shri Gupta of Uranium Corporation of India Ltd and Dr. Dinshaw of Tata Memorial Hospital. It is indeed to this spectrum that I got exposed when I was associated with AERB.

The second point pertains to technology transfer. There are any number of specialists who point out that technology transfer is best accomplished on the plane of the personnel. I saw it most effectively achieved in this Dept. Heavy water industry was built by scientists and engineers who had developed the technology themselves. This is typical of what is happening all the time in the unique environment of the programmes here. Right now the Prototype Fast Breeder Rreactor is being erected at Kalpakkam by the very people who developed the technology in the first place. At least I have not witnessed this aspect taking place anywhere else in the country in the same technical depth. The DAE community deserves to be complimented to have mastered technology transfer almost as if it is its cultural characteristic.

There were many occasions when the over-all technical strength and the world class professional approach of the department came to surface. Among those I have seen first hand, I would like to highlight the restoration of the dome of the Kaiga reactor inner containment. The delamination that had occurred while its pre-stressing cables were being tensioned posed a major challenge. How the problem was investigated, the dome reengineered and a new dome constructed to exacting standards is a true testimony to the professional calibre of the DAE community. I must not fail to mention the crucial role played by AERB in resolving this important issue.

Yet another gratifying aspect of my tenure was that we could set up the Safety Research Institute (SRI) at Kalpakkam to carry out R&D in areas of interest to AERB. As you may know, our proposal for the project

was sanctioned within one month; my friend Placid Rodriguez, Director IGCAR readily gave the land and infrastructure support that helped impart a jump start to the Institute. Some months ago, I received an e-mail from Sunil Sunny stating that he had been awarded his Ph.D for his work in SRI; that was truly a moment of great joy for me.

My days at AERB have always been very vibrant and enjoyable and I cherish very much all those rewarding memories. Today I find that AERB has grown in strength, in activities, in infrastructure and so on. It is my great honour to have been given the opportunity to be amidst you all on this historic occasion; and it is my great pleasure to wish AERB many more years of outstanding professional accomplishment.

Prof. S. P. Sukhatme,
Former Chairman, AERB

Let me at the outset say that I am very happy to be present on this occasion during the silver jubilee year of AERB when we are adding a new building to the existing Niyamak Bhavan. The process of construction was initiated when I was Chairman and I am happy to see that it has been completed. I am also happy to note that a formal 'AERB Code of Ethics' has been prepared and is being released today.

The previous Chairmen have taken a look at the past. How AERB began its work in 1983 and how it has grown. How it started functioning initially in the Old Yacht Club, moved on to Vikram Sarabhai Bhavan and then to the present location. The past is obviously important and is always with us. Remembering it yields important lessons and the reviews by the previous speakers gave valuable perspectives.

However, in the short time available to me, I propose to go in another direction. I shall look to the future and highlight some issues and challenges which lie ahead for AERB. I shall also lay down a guiding principle for decision making.

The challenges are obviously many and I will focus only on two. Both issues are important and for that reason, too much should not be read into the order in which I take them up or to the fact that I will not be mentioning other issues. My comments will be general in nature and I will be speaking in an overall sense.

Perhaps the biggest challenge which AERB faces in the future is the challenge of attracting talented human resources into its fold and of retaining these personnel through well-designed human resource development programmes. This is a challenge particularly for those in charge of AERB. You may have buildings, you may have equipment, you may have computers, you may have all the material resource necessary.

However, you will go nowhere without the right kind of people. The success of an organization depends upon its human resources. I would like all those who are in AERB to ponder over this fact and always keep it at the back of their minds.

Needless to say, a lot has been done in this regard within AERB and within DAE, the BARC Training School being an outstanding example. It required vision to set up such a school in 1957 and it is because of this vision that leadership has been provided for carrying forward the country's programme in atomic energy. But human resource development does not end with having a training school, the development of people has to continue right through their careers. To my mind, that is the real challenge. You have to take young people who are well educated and qualified, orient them with appropriate training at the beginning and ensure that their education continues during their tenure in AERB. The process of learning and the desire to acquire knowledge must never end. Only then will AERB be a vibrant organization, which discharges its role efficiently.

The second challenge which I foresee is the need for more transparency. It is two years since I left AERB and I see this issue as a challenge even more clearly now. I am convinced that AERB needs to make more of its actions, decision making process and decisions known in the public domain. Again, I don't want to give the impression that nothing has been done or is being done. AERB has a good website, press releases are issued from time to time, and interactions take place regularly with the public. So AERB has a good track record. Also, I am not saying that transparency means telling everything and talking about everything. Transparency obviously has its limitations. However, in today's world with media closely watching all developments, AERB as a regulator has to do more in this regard.

Amidst these issues and challenges, what should be the guiding principle is for the staff of AERB when it comes to taking decisions. I believe that all times, the guiding principle has to be 'Is what I am

doing fair?' As a regulator, sometimes you have to be hard as a diamond and sometimes soft as a flower. However, all the time whether one is hard or soft, one's actions have to be guided by a sense of fairness and correctness. In this context, it is very appropriate that AERB is releasing a Code of Ethics today, a set of rules for behaviour and for taking action.

When faced with an issue requiring decision, what does a person as a regulator do? He reads and understands the papers on the subject, has discussions and meetings with the appropriate people, talks to the persons directly concerned and then finally comes to a decision. In this process, the individual who takes the decision, whether he be Chairman AERB, Chairman SARCOP or Chairman of some other Committee, has to ask himself the question –"Is my decision a fair one? Is what I am doing beneficial to the needs of my country and of society?"

AERB has done well in its first twenty-five years. It has grown in size and stature. I am sure it will improve on this record in the next twenty-five years. My best wishes for its continued growth and success.

S. K. Sharma,
Chairman, AERB

Friends, we are here to celebrate the start of the Silver Jubilee year of AERB. In November 1983, AERB started with an humble beginning with a handful of people at Old Yacht Club. Later it moved to Vikram Sarabhai Bhavan and further to Niyamak Bhavan. Now we have about 200 employees and one more office building, Niyamak Bhavan-B is going to be inaugurated today. In between AERB also took a southward turn, thanks to Prof. Rama Rao, and it established the Safety Research Institute (SRI) at Kalpakkam. Prof. P. Rama Rao told us that regulators should also be in the thick of scientific research: research which is of value to safety and regulation, and that is how SRI got started. I am happy to inform you that SRI is flourishing day by day and is doing very good and useful work for us.

During all these years there has been a strong emphasis on development of in-house competence and today we have a fair amount of expertise available in several specialized fields like reactor physics, thermal hydraulics, probabilistic safety assessment, seismic engineering, concrete technology, risk assessment of chemical process plants and so forth. Several of our experts are there in the committees of Bureau of Indian Standards for development of national standards. We also have won some research contracts from the Ministry of Environment and Forests for specific jobs like developing risk assessment standards for the chemical industries.

The main thrust of work in AERB is the design and operational safety review of nuclear and radiation facilities, enforcement of industrial safety in DAE units and development of safety documents. In doing this work, we had several challenges and difficulties which we faced during the last twenty four plus years. Some of them were the turbine hall fire in Narora, Kaiga inner dome delamination, safety of coolant channels in pressurized heavy water reactors, the problem of feeder pipes thinning, flow assisted corrosion of the secondary system piping, damage to the

moderator inlet manifold in the calandria of MAPS units, cracking of endshield in RAPS, unintended power rise in Kakrapar, ash pond breach and ropeway failure in the Heavy Water Plant, Manuguru, and the most recent being the flooding of the PFBR pit during the Tsunami of December 2004. We were able to tackle all these problems reasonably well and this was due to very hard work put in not only by the staff of AERB but also by several of our technical support personnel like BARC specialists, IGCAR specialists and the very special manpower resource that we have in the form of our retired colleagues. I must take this opportunity to profusely thank them all for all the help extended and I am sure that this will continue.

Another hallmark of AERB is that it does not hesitate to take help in safety evaluation from the experts of its licensees organisations and this arrangement has been working very well. When these experts sit on our side of the table, they wear a different hat and many times we have seen that they are stricter than AERB staff in enforcing safety. This I think is a very important aspect of safety regulation in this country.

Atomic Energy Regulatory Board is a unique type of regulatory body as it has to deal with not only a large number but also a large variety of designs of nuclear power plants and also fuel cycle facilities. Look at the type of nuclear power plants we have: we have boiling water reactors at Tarapur 1&2; we have 220 MWe and 540 Me Pressurized Heavy Water Reactors and recently we have been asked to examine the safety of 700MWe PHWRs. We then have the 1000MWe Pressurised Water Reactor being built at Kudankulam, Proto Type Fast Breeder Reactor and the Advanced Heavy Water Reactor. In addition to the nuclear power plants, we have several fuel cycle facilities like the fast reactor fuel cycle facility at Kalpakkam, UCIL facilities with several new mines coming up at Banduhurang, Mohuldih, Gogi and Tummalapalle, the NFC units at Hyderabad and the new Zirconium Sponge Plant at Pazhyakayal. There are beach sand minerals industries and recently several private entrepreneurs have entered into this business. We have industrial gamma irradiators, industrial radiography facilities and a large number of nuclear medicine and radiotherapy facilities. In addition we

have the heavy water plants and also the diversified projects of Heavy Water Board for development of solvents, enrichment of boron, recovery of uranium from secondary sources etc.

We have been also engaged in recent times in safety review of old plants like RAPS 1&2, MAPS 1&2, Tarapur 1&2, IREL Thorium Plant at Trombay and some of the facilities at Nuclear Fuel Complex, Hyderabad. We have conducted these safety reviews in a very extensive manner. I am happy to inform you that the work done by AERB has won appreciation not only from people here but also from several foreign regulatory body personnel. Towards formal validation of our quality management systems, we obtained the ISO 9001 : 2000 certification from the Bureau of Indian Standards in September 2006.

We have our share of problems as well. We have the problem of denial of shipment of radioactive material, problem of low level radioactive contamination in steel products in export consignments and loss or theft of radiation sources which are used in industrial radiography. And for these we have to deal with several agencies, not only the facility owner but also various government authorities, the police and even the lawyers.

Another area of our work is laying down safety regulations in the form of safety documents. This work was started right in the beginning as soon as Prof. De took over as the first Chairman of AERB. I remember that even in early 1984 when this work started, I was myself a member of the committee for developing the safety code for operation of nuclear power plant. As of now we have over 120 safety documents published and another 20 or so for which work is in progress. Even though we do not regulate the BARC facilities, we took it upon ourselves to develop the safety documents for radioactive waste management and for spent fuel reprocessing. I am happy to inform you that this work is progressing very well.

Even though AERB is a regulatory body, we consider it our duty

not only to just carry out the safety reviews and enforcement actions but also to proactively involve ourselves in bringing about initiatives for safety enhancement. And in this direction we conduct training courses, workshops, discussion meetings and even awareness programmes. AERB has instituted industrial safety, fire safety and green-site awards that are given every year to the best performing DAE units in the respective areas. I think this has stood us in good stead as several problems can get solved when we have a organized and structured discussion between the regulators and the regulated.

We are also quite deeply involved in several activities of the IAEA. We have representation in INSAG, Commission on Safety Standards, Transport Safety Committee, the Incident Reporting System of IAEA/ NEA, International Nuclear Event Scale based reporting, the illicit trafficking database of IAEA and we also participate in some IAEA coordinated research programmes and various technical meetings and seminars.

We have bilateral co-operation with USNRC for the last four years in which we already had eight discussion meetings. Similarly we have bilateral co-operation with the French Nuclear regulatory Body, ASN, and with the Russian Nuclear Regulatory Body, ROSTEKHNADZOR. We are also in the CANDU senior regulators group and recently have joined the VVER senior regulators forum. We have been able to get some of our younger colleagues trained abroad. Two of them were trained in Sweden under Prof. Balraj Sehgal and I must thank Shri S. K. Mehta for initiating that. One officer was trained in Italy on uncertainty analysis and two of our colleagues were recently trained in USNRC in the area of risk informed inspection. One officer has been sent for post doctoral studies in Japan under the JSPS scheme.

Well, this is what we have been doing in the past. And now we are in the silver jubilee year and we have drawn an outline of the activities to be conducted in the year-long celebrations. Of course the first one is this function wherein we will have the new building inaugurated by Prof. De. We also have brought out a code of ethics for AERB which will be

released by Chairman AEC today. We also plan to bring out monographs on some topics of interest and one such monograph on probabilistic safety assessment has been prepared and will be released by Chairman AEC here. Another monograph on construction safety is getting ready and we plan to get it released during the DAE Safety Professionals Meet in December this year at Rawatbhata. And then we have a plan to conduct a workshop on safety regulation of nuclear and radiation facilities in India for our media friends. We have talked to a few of them and they seem to be quite excited about it. In addition we have planned a number of seminars on technical topics and invited talks from eminent speakers including our Board members. Towards the end of the silver jubilee year we are going to have an IAEA International Conference on Topical Issues in Nuclear Safety during November 2008.

Sometime back India ratified the convention on nuclear safety and the 4th review meeting under this convention is going to take place in April 2008. Our national report has already been prepared and submitted and in this work there has been substantial involvement of the AERB staff. The nuclear and radiation facilities in our country are expanding at a very rapid pace. They are also getting spread all over the country. So in the eleventh plan, apart from augmenting our manpower resource, we are also planning to open two regional centres of AERB. One will be located in the eastern region in the Rajarhat complex of VECC & SINP, Kolkata and the second one we will locate near the guest house of our Safety Research Institute at Kalpakkam. With that we hope to be able to carry out our regulatory activities in a more expeditious and efficient manner in these two regions. For the western region, we will continue to work from Mumbai but for the northern region, may be subsequently we will think of opening another office.

Friends I once again welcome each and every one of you to this function that marks the start of the silver jubilee year of AERB. Thank you.

Shri. S. Vasant Kumar, Former Vice Chairman, AERB

I am indeed very happy that AERB is celebrating 25 years today. It's a long journey and we have reached certain maturity. I am so glad about it. We have passed through many milestones and achieved many important things. I had the good fortune of being associated with the DAE-SRC. I have very pleasant memories of those days and after SARCOP was formed, I was a member of SARCOP. Mr. M.S.R Sarma was the first Chairman of SARCOP. After SARCOP and AERB came into existence, there was a change in the approach: there was more professionalism in all the deliberations in SARCOP and in the activities of AERB. As the famous Sanskrit saying goes "Vajradapi Katorani Mriduni Kusumadapi, Lakottaranam Chetamsi Kohi Vijyatum Arhasi", a regulator has to be tough like a diamond and soft even like a flower. So a regulator will have to react to situations in different ways. I think in many cases we have adopted both these methods. During my tenure as a member of SARCOP and subsequently as Chairman SARCOP and in other activities of AERB, I had many occasions where we applied these two principles appropriately. That is the main principle on which a regulator has to work. When an important issue is involved which requires a hard decision, one should not hesitate to take such a decision. But we should also keep in mind the overall progress, the overall interest of the organization.

In all these 25 years, we earlier depended very much on the expertise available in BARC and other organizations to help us. I am very glad to know that now AERB has reached a certain maturity and there are good number of youngsters who have joined AERB and will be able to discharge these functions.

Well I encountered many challenges during my tenure. I can recall some of them here. My first challenge was to prepare the technical specifications for a reprocessing plant. This was a spin off from the reactor system and reprocessing plants did not have any technical

specifications. The main problem we had was what the reactor wants to achieve, reprocessing plant doesn't want to achieve. Namely the main aim in a reactor system is to make it critical and in a reprocessing plant one has to prevent any criticality. We did not know how to match these things. Mr. Soman helped us a lot in understanding what a technical specification was. It was necessary to understand the purpose of a Technical Specification and write them to meet the safety requirements. I am very glad to say that over these years we have had the technical specifications prepared for all the non-reactor facilities in DAE and it's really an achievement. It may not be exhaustive, it may require corrections, but a document is available and people in the non-reactor areas know the importance of technical specifications and the need to follow it for safe operation.

We had many more challenges like the fire at Narora Atomic Power Station. It was a very good team effort by both the people at Narora and the regulatory body coordinating effectively. We could arrive at very solid conclusions and it actually got us recognition internationally. In fact when I went to the IRS (Incident Reporting System) meeting of the IAEA, the way we have tackled the incident at Narora was well appreciated. They were wondering how we could handle the emergency situation so effectively. It emphasized the training that we give to all our personnel who were manning the plant. A delegation from USNRC came to find out what sort of training we impart to our shift engineers and other engineers. It is a matter of pride that we could get an international acclaim and that shows the quality of people that are available in this organization.

Subsequently we also had the problems with the bent sub assembly of FBTR. The French people refused to help us in that but we could arrive at our own methodology and retrieve the bent tube. The SARCOP deliberations we had on this topic were really memorable.

The reactor safety and radiation safety were getting sufficient importance but industrial safety is another wing, which is equally

important. We initiated efforts to focus attention on Industrial Safety. The safety officer in any unit did not have sufficient importance in the entire setup. So to give him that sort of an importance we organized annual meetings of the safety professionals. We had every year a theme topic where we would invite experts from outside to come and deliver lectures and it had been a great success. Then we had fire safety and occupational health also associated with that. We initiated giving awards on safety day. These are all the promotional activities that AERB did and I am glad these are continuing. I was happy that all the heads of units including Chairman AEC have been encouraging this activity.

These are some of the initiatives we have taken over these 25 years. I am sure with the bright people and the experienced people, AERB will go from strength to strength and will be a model for regulation and continue to flourish.

Shri. G. R. Srinivasan
(Former Vice Chairman, AERB)

I have observed the growth of AERB from 1983 to now. I am able to recall how it was built brick by brick to the present status of being able to fulfill satisfactorily all its obligations. I would like to appreciate the efforts of all the previous and present Chairmen, Vice Chairmen and entire staff who have preceded me and were after me.

There were times when there was tremendous stress for the Board as well as AEC on regulation. It was extremely important to match growth in production with being able to carry out its mandate of ensuring public, environmental and occupational safety. However, as it happened in many other countries, the growth of Regulatory Body matched the growth of the nuclear activities in India.

I had a chance to study closely the regulatory processes in US, Russia, France, Canada, Korea, Finland and many other countries and I find that the regulatory system in India, under AERB, is comparable. But this should not stop us from marching towards excellence in regulation. Marching towards excellence is a continuous journey, not a destination.

One piece of advice is that we must continue the dynamic rhythm with which we had commenced and conducted training for competency development in AERB. We had employed the SAT (Systematic Approach to Training) process for training of AERB staff. In my opinion the independence of any Regulatory Body stems as much from the esteem with which the licensee holds the licensor because of their competence, of their maturity, balanceness and because of the way they achieve adequacy in dealing with safety issues. The training course covers all the aspects which I have mentioned above and include even such characteristics of the unenvying job of a regulator, negotiating technique etc. Needless to say, in addition to the above, independence needs to be established by legal and regulatory framework.

It is difficult to dissociate oneself from the global renaissance which is taking place in nuclear power. This renaissance is public driven, user driven and not industry driven as they were earlier. Hence, it is going to be sustained and irreversible and will stay. There is bound to be shortage of the three resources: men, material (raw and manufactured) and money. India can see these as opportunities. I will not be surprised if in 15 years from now, Indian nuclear industry, like IT now, puts India in a position of global supplier of all three resources i.e. manpower, material and even funding. Specifically, the shortage of manpower will have an impact both the licensee and the licensor. One has to really develop and plan human resource because you can't produce competent people overnight.

Activities of both licensee and licensor, especially to ensure safety, are knowledge driven. We must remember nuclear industry is an unforgiving one.

I would also like to support the methodology being adopted for regulation in India, i.e. inclined towards the informal method. This is somewhat similar to the French methodology. There is tremendous brainstorming on all issues between experts from all agencies both within and outside DAE and including from licensee organizations.

The objective is common between all these experts i.e. to achieve production consistent with safety, safety having an overriding importance. In fact our observation is when the licensee wears the cap of a regulator, he becomes harder than the regulator.

The regulatory burden is inversely proportional to the pro-activeness of the licensee. It is also observed that inherent safety is always stronger than an induced one. I would request for a good safety culture and pro-activeness in their (licensee) organization, not that it is not there now, but we always aim at excellence.

I am sure that the next ten years, we would see more activities than

what we have seen in the last 25 years. I am confident that AERB will gear up for it, continue to carry out its mandate and be one of the globally leading regulators.

Message from M. S. R. Sarma, Former Chairman SARCOP

The safety practices are governed by the directive given by Bhabha in the early days which reads "Radioactive material and sources of radiation should be handled in Atomic Energy Establishment, in a manner, which not only ensures that no harm can come to workers in the Establishment or any one else, but also in an exemplary manner so as to set a standard which other organizations in the country be asked to emulate." This directive was when we had not even started handling radioactive materials. He wanted DAE to be a role model and to a large extent it had been; particularly in the areas, of course, of safety, quality control, multi-disciplinary training, multi-disciplinary activities, merit promotions etc.

In the initial days of Apsara, there was no specific committee as such to review the commissioning / operations. However, all those who matter including Bhabha, used to be present, more or less on every occasion in the initial days of Apsara operations. Dr. Bhabha also directed that when the reactor is shutdown overnight, one fuel element from the core be removed and put aside in the pool as abundant caution. This is how the safety culture in the department had started.

When it came to CIRUS, a committee was constituted, headed by A.S.Rao to authorize the commissioning operations and also review "Hazards Evaluation Report". Ironically, nuclear industry, the world over has been its own "Devil's Advocate" using terminology such as Hazards Evaluation Report, maximum credible accident, maximum permissible concentration, criticality etc. and these phrases certainly caused alarm in the minds of the common man.

Tarapur units-1&2 were licensed for operation in US by USNRC. Hence no review of the safety was done but a committee designated as Start-up Committee was constituted to review and authorize various start-up tests

/ operations in the initial days. When it came to RAPS, a safety committee was constituted, headed by S.L.Kati to recommend to Chairman, AEC for permission during various stages of commissioning. Subsequently the DAE Safety Review Committee (DAE-SRC) was constituted, headed by A.K.Ganguly. The DAE-SRC was mandated to supervise the safety in all the activities of the department including industrial safety. While this was in vogue, the Atomic Energy Regulatory Board (AERB) was constituted in 1983 with a mandate to oversee radiation safety in the entire country including DAE installations as well as industrial safety in all the units of the department.

During the initial stages after the constitution of AERB there was a tremendous communication gap between DAE-SRC and AERB. Prof. De, the first Chairman of AERB, took this very patiently in his stride. This situation of course got corrected when SRC was re-designated as SARCOP and merged with AERB. I am one of those privileged to have joined the AERB in the initial stages and my experience in the utility had strengthened my conviction with regard to decisions involving safety. The first job assigned to me was to head a committee to review the industrial safety status of DAE units. This committee made recommendations with reference to industrial units under construction as well as in operation. Specifically another committee was constituted to review the industrial safety status of R&D units. That committee also came up with recommendations for a structured organization. This has been a very important contribution towards promoting industrial safety as well as giving some sense of status to Safety Officers.

The concept of technical specification was taken from Tarapur. This was the practice laid down by USNRC. Canadian practice was to have operating policies and principles (OPPs). We started with OPPs for RAPS and subsequently adopted the Technical Specifications. This concept was carried forward to all the power plants. Further, it was applied to the other units of the department i.e. Heavy Water plants, Reprocessing plants, Nuclear Fuel Complex, IRE etc. This has become a guiding principle to be complied with by the utility. Any violation was

to be reported to AERB. Consent to restart the utility had to be obtained from AERB.

People often question the independence of the regulatory authority because it is part of the department in their view. In lighter vein I used to say that we need two Prime Ministers, one for the executive and the other for the safety. In my tenure as mentioned earlier, I have been on both sides, operations and regulations and at no time was the safety body over ruled by the powers that be. I give a few instances to illustrate the above:

1. When I was with the utility, I had approached Chairman, AEC on two or three occasions pleading with him about the decision of SRC and I had submitted a note in writing, justifying my plea. As could be expected, nothing came out and I stopped complaining subsequently.
2. There was a proposal to reduce the exclusion distance to 1 KM which was not agreed to by DAE-SRC. When the matter went up to Chairman, AEC, it was returned with a note that "both of you should agree on a figure and come to me for approval". Hence 1.5 KM exclusion distance stands even today.
3. A hold was put on restart of HWP(Kota) after H2S leak occurred in the plant coming out into the environment. There was organizational deficiency and AERB insisted that they should have a protocol for No. 2 & 3 in the organization and also an order directing that at least one of these should be present at station all the time. This was appealed to Chairman, AEC and, of course, he did not overrule AERB's decision.
4. On another occasion FBTR tripped on over power and we asked them to investigate before the restart and this was appealed to Chairman, AEC and he said; "either you convince AERB or comply – don't come to me for arbitration".
5. On one occasion, one of the units had exceeded the agreed to annual manrem in the first half of the year and hence a hold was put on the unit to restart and the unit was asked only to

do emergency maintenance so that the manrem consumption got normalized. On this issue Chairman, AEC made a visit to the unit and advised them in strong terms to adhere to the limits agreed to on consensus.

6. During the initial stages of Dhruva operation the fuel elements used to get dis-assembled due to flow induced vibration. The design was modified to correct the situation and reactor started operation. After some period of operation the safety committee wanted one fuel element to be taken out for inspection. The BARC authorities were not readily agreeable but we had to convince them about the necessity for this inspection to ensure trouble free operation in future. Dhruva authorities complied.

At the time of criticality of FBTR there was a lot of publicity given about the ensuing event and the regulatory board was meeting on that day to consider permission for criticality. One of the members was sore about the meeting. In his words "are we a rubber stamp". My colleague and I had inspected FBTR to assess their readiness and made a recommendation to the Board to consider the FBTR application for criticality. Hence, I butted in and said that in the view of FBTR they have complied with all the pre-conditions and were awaiting only the formal approval from the Board. To that he questioned "if we don't approve what will they do"? I immediately said they will wind up and go home and will not move one step forward without formal approval from the Board. This has been the tradition in the department all along. Of course finally the Board approved and gave its consent for criticality of FBTR.

While people with operating experience were initially preferred subsequently it was felt that their knowledge in other areas need to be updated with respect to prevailing codes, guides and standards. Hence, a complete training programme was started in AERB for those who were already there as well as those who were joining afresh. This is very important since the regulator must be able to discuss with the operator on equal footing on the knowledge base.

In my own experience I have avoided being present on the first

approach to criticality during my tenure with the regulatory body. Basically being an operator I was afraid that I might give in to the plea from the utility for some concession in the process of approach to criticality.

A practice of visiting the units at least once in a year was started with SARCOP and this certainly has brought benefit to both sides i.e. the regulator as well as the operator.

With respect to Industrial Safety an annual meet of the Safety Professionals was initiated by G.R.Balasubramaniam and when I took over SARCOP it was handed over to me to carry the mantle. This has been going on successfully with the Safety Officers highlighting their difficulties and problems in their units which SARCOP used to take up with the Heads of units for redress. Subsequently this was joined by occupational health professionals and that also has been bringing good interaction between the units and sharing of experience among them.

When BARC was taken out of AERB's purview there was a furore and coincidentally at that time INS Annual Conference was being held and Dr. Chidambaram was invited to inaugurate the same. After the function when the press questioned him about the implication of this move he looked at me and said to the press "He has been with the department since inception. He was part of BARC initially, then joined power projects and finally ended up with the regulatory board. He is also the President of INS at present, hence you can take his views." I had to tell them that we started our career with BARC where respect for safety and practice of safety culture were imbibed from the beginning. We had carried forward the same into other units wherever we had gone. The present change does not warrant any concern since BARC will also have safety committees to enforce safety in their operations and also the present separation is in line with the international practice.

Although it is alleged that AERB is part of the Department of Atomic Energy, AERB never hesitated to put its foot down when it was necessary.

Hence independence of the board was never in question in the day to day functioning of the departmental activities. In several committees people from all units of the department were co-opted. It goes to their credit that whenever they become part of the safety committee their allegiance has been towards safety even at the cost of their parent unit.

The order constituting AERB stated that the mandates laid down by the Board shall be complied with and any objections shall be appealed to the commission subsequently. Of course there was no occasion in all these years when an appeal had to be preferred.

AERB does not have the practice of stationing inspectors at utility site. During important / crucial operations observers are sent to make their observations and report to the Board after discussing with the utility. Essentially this has been the process of self regulation where the utility reports the violations and seeks consent for re-start depending on the severity. This has been working very well and is certainly a reflection on the maturity of both the operator as well as the regulator.