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Statement by Dr. Anil Kakodkar, Chairman, Atomic Energy Commission and Leader of the Indian Delegation

Mr. President,

I congratulate you, on behalf of my Government and on my own behalf, on your election as President of the 47th General Conference. I am sure that, under your able leadership and with the support of your Team and the Secretariat of the Agency, this General Conference will be able to accomplish the tasks before it.

I would like to compliment the Director General Dr. Mohamed ElBaradei on his continued successful stewardship of the Agency. He faced some of the biggest challenges this year, but was able to carry out his mandate effectively and impartially.

Mr. President, at the outset, I would like to repeat what I had said in the recently held international symposium on Innovative Reactors and Fuel Cycle here in Vienna.

According to the World Development Report 2003 of World Bank, world's population crossed 6 billion mark in the year 1999. Most current estimates suggest that around 2 billion people will be added over the next 30 years with another billion in the following 20 years. Virtually all increase will be in the developing countries with the bulk in urban areas. The core challenge for development would thus be to ensure availability of productive work opportunities and access to basic amenities for these

people. At present, however, there are wide disparities. The average income in the richest 20 countries is now 37 times that in the poorest 20 and this ratio has doubled in the past 40 years. Availability of energy within the reach of everyone could significantly correct this situation. Energy is the engine for empowerment and growth. It multiplies work done through human labor and increases productivity. Availability of energy thus leads to enhanced livelihood and access to better amenities. With the sustainability issues staring at us, this realization is possible only if the energy supply becomes abundant and within the reach of all. Only the power of atom can make it happen.

As we commemorate the “Atoms for Peace” initiative launched fifty years ago and take stock of the achievements, which are indeed very impressive both in terms of share of nuclear electricity in the total electricity production as well as in terms of other non-electricity applications, the barriers to growth of this important technology for the benefit of the larger part of humanity are yet to be addressed. This is better done before it is too late as otherwise the threat to global climate as well as the inequality tensions could assume unmanageable dimensions. Clear signatures of these threats are already visible.

Combating the dangers of malevolent use of nuclear and radioactive material by unscrupulous and terrorist elements has emerged as a new threat. We are glad to see that this issue is receiving due attention in the Agency. We recently conducted in collaboration with the IAEA an international training course on Security for Nuclear Installations. The course was well received and the feedback is encouraging. This course could serve as a ’model course’ and we could conduct more such courses on a regular basis.

We welcome the G-8 statement on the safety and security of radioactive sources. India actively participated in the search operations to locate orphaned sources in Georgia. Our expert team joined IAEA and provided state-of-the-art Arial Gamma Spectrophotometer Survey system and other survey meters. India has actively participated in discussions on evolving the IAEA Code of Conduct on the Safety and Security of Radioactive Sources. Let me inform this august gathering that we have in place adequate legislative and regulatory infrastructure to achieve the objectives of this Code of Conduct.

Our atomic energy programme, which is in its 50th year, has come a long way on its march to serve Indian people. Today we are on a fast track growth backed up by a strong R&D, industrial and safety infrastructure. In around four years from now, we would reach an installed generating capacity of around 4500 MWe with Pressurised Heavy Water Reactors, the main stay of the first stage of our indigenous nuclear power programme, and another 2320 MWe with Light Water Reactors making a total of around 6800 MWe as against the present capacity of 2720 MWe. A few days back Government of India has approved construction of a 500 MWe Prototype Fast Breeder Reactor (PFBR). This indigenously developed technology can enhance the installed power generation capacity to well above 300,000 MWe even with our modest Uranium resources. Pre-project activities for PFBR project have already commenced with some of them already completed.

Nuclear electricity generation of 19,358 million units (MUs) was realized during the year 2002-03 with Nuclear Power Corporation of India Limited (NPCIL) achieving annual overall capacity factor of 90%,

which is among the best in the world. The Kakrapar Atomic Power Station – 1 was judged the best performing unit amongst PHWR category during the rolling 12 months period from October 1, 2001 to September 1, 2002. For the calendar year 2002, the three NPCIL PHWR units were amongst the five best PHWR units in the world.

The WANO peer reviews for Kaiga Generating Station and Rajasthan Atomic Power Station Unit – 3&4 were completed during January 2002 and January 2003 respectively. All the operating nuclear power stations are now ISO 14001 certified.

En-masse coolant channel replacement and upgradation of unit-2 of Madras Atomic Power Station was completed in a record time of about one and a half years. Scale up of the PHWR design to 700 MWe by permitting partial boiling in the channels of 540 MWe unit design is also progressing on schedule.

Fast Breeder Test Reactor [FBTR] is in operation at IGCAR since 1985 with indigenous Uranium-Plutonium Carbide fuel and has achieved a burn up of 103,000 MWd/t with excellent performance, without any fuel failure. The irradiation of Uranium-Plutonium mixed oxide fuel of PFBR composition (30 % PuO_2 and 70 % UO_2) using U-233, as additional fissile supplement to achieve the required linear heat rating has commenced in FBTR in July 2003. In order to close the FBTR fuel cycle, a facility for reprocessing the carbide fuel has been commissioned and the reprocessing campaign has commenced.

The second Waste Immobilisation Plant (WIP) for the vitrification of the high level waste was commissioned. The Uranium Thorium

Separation Facility for separation of uranium 233 from irradiated thorium fuel on a plant scale has become operational.

Growth of nuclear energy in the developing countries particularly in fast growing economies with large population should be a matter of global interest in view of its potential to protect the earth from irreversible climate changes. Wherever there are no genuine concerns, barriers to deployment of nuclear energy technologies need to be examined and brought down through a pragmatic approach. We must move towards a more peaceful and prosperous world on the basis of plenty of energy available within the reach of all. Mindless controls without addressing the core issue of meeting development aspiration of the needy does not help the situation. Rather it makes matters worse.

The International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) of the IAEA for the development of the next generation of nuclear reactor and fuel cycle technologies is important in this context. It has the potential of providing a technological solution to address the barriers to deployment of nuclear power worldwide. Development of Advanced Heavy Water Reactor (AHWR) in India, which would more than meet the INPRO objectives in terms of sustainability, economy, safety and proliferation resistance, is progressing according to plans. In addition, this reactor system would enable us to get started with large scale energy production using Thorium.

We are conscious of our responsibilities arising from the possession of advanced technologies in the nuclear field. We have a commitment and an interest in contributing as a partner against proliferation. Even as we move forward towards developing and using

proliferation resistant nuclear technologies we must shed the baggage inherited from the past – which still restrict the flow of equipment and technologies related to the peaceful uses of nuclear energy.

Looking from the perspective of a large and growing economy like India, with its small hydrocarbon reserves and depleting coal reserves, development of nuclear energy based on a closed cycle approach enabling fuller use of uranium and thorium is the only way to meet development aspirations of over a billion people. Based on a recent study, India needs to reach around 5000 Kwh/capita of annual electricity availability to assure a quality of life consistent with modern norms. This would be possible only if the share of nuclear power is at least 25%. We are therefore pursuing a comprehensive R&D programme to explore newer technologies to widen the scope of nuclear energy use. Programmes are already under way to develop FBR fuel cycle with shorter doubling time, clean up of Uranium-233, Accelerator driven systems for better doubling time with Thorium fuel cycle and for waste transmutations, and a Compact High Temperature Reactor. Together these developments would help faster deployment of nuclear energy, further simplification of radioactive waste issue and expand role of nuclear energy as a primary energy source.

At our Institute for Plasma Research, SST 1, one of the world's first super conducting steady state tokamaks with elongated diverter plasmas and 1000-second operation capability is undergoing erection and commissioning. We are watching the recent developments in the progress of ITER and would be keen on opportunities of participation in this international effort.

The thickly populated coastal region of the southern state of Kerala, with its vast deposits of Monazite sands (a rich source of Thorium) and high natural background radiation has provided us an unique opportunity to study effects of low level radiation on human beings. Dose rates in this region range from 1.0 mGy/year to as high as about 40mGy/year which envelope the range of occupational exposures. The studies so far indicate clearly that high level natural radiation has had no discernible impact on the health of the population. The research conducted in this area has the potential to provide valuable insights to our understanding of the mechanisms of response of biological systems to low level radiation.

Various Institutions in India are participating in the STAR experiment at the Relativistic Heavy Ion Collider in the Brookhaven National Laboratory of United States. Photon Multiplicity detectors for the experiments have been fabricated and assembled. India's participation in the Large Hadron Collider (LHC) and its experiments CMS and ALICE under construction at the European Organisation for Nuclear Research (CERN), Geneva, has been expanding to mutual benefit. Several state of the art technology items have been supplied from India.

The Giant Metrewave Radio Telescope (GMRT) is now a full fledged international observational facility for radio astronomy below 1.4 GH_Z. A number of national and international users have started observing a variety of astronomical objects from our galaxy as well as from other far off galaxies using this facility. Gamma ray astronomy facility at Mt. Abu is also operational.

The TC programme of the agency has been playing a valuable role in developmental activities using nuclear techniques. We have a comprehensive domestic programme on applications in agriculture, health, water resources and industry. We have been and would continue to be active in sharing our experience with other countries. Our Honourable Minister of State for Water Resources Mrs. Bijoya Chakrovarty and Chairman, Task Force on Interlinking of Rivers, Mr. Suresh Prabhu participated in the agency programmes here in Vienna. Last year we trained 33 IAEA fellows in India and hosted 8 IAEA & RCA events and sent 50 experts on different IAEA assignments. We would continue our strong support to IAEA activities. The Agreement reached this year to establish a link between the growth in the regular budget and the quantum of TCF, we hope, will further enhance the resources available for Technical Cooperation. We have been consistently pledging and paying our contribution to TCF in full. We do so this year too.

The Agency's programme on 'managing and preserving the knowledge' is timely and relevant to the nuclear industry. In India we are in a fortunate position with respect to our very capable human resource available in large numbers. We could therefore effectively contribute to global efforts in this area. The recent coming into existence of the World, Nuclear University is a very positive development, in which we intend to participate effectively. We also participated actively in the establishment of Regional Asian Network for Higher Education in Nuclear Technology. It may be also worthwhile at this stage to mention that Indian scientists have perhaps made the largest contributions to scientific publications on Pressurised Heavy Water Reactors.

Last year, we witnessed the intense consultations in the IAEA Board to arrive at consensus for the Programme & Budget for the years 2004-05. The spirit of compromise and comraderie typical of IAEA resulted in the final compromise position. The opportunity provided by the decision to move away from the Zero Real Growth concept enabled us to rectify certain imbalances and to remove some procedural complexities which had crept in over the years. The trust that Member States have in the Agency's capability to deliver programmes that would benefit humanity was again abundantly clear. The Director General's initiative of the one house concept must be fully realised and not remain as a mere slogan. This can be done effectively with 'technology' as the key driver comprehensively addressing and linking various programmes of the Agency. We stand ready to participate in the various studies proposed by the Board to further streamline procedures and to effect economies.

Mr. President, before I conclude, I wish to remind the GC that the improvements in quality of human life have primarily come about as a result of developments in science and technology. Some new problems may have arisen in the process, but even their resolution took place through further application of science and technology. Looking back to the 1950s and 1960s, it was then feared that developing countries with large population like India, would not be able to feed their growing populations. Thanks to the green revolution in agriculture, the doomsday scenarios of famine and starvation did not materialize in these countries. In the development of nuclear power technology like wise, there is a need to embark on a new technological revolution and address residual issues facing us, in the developing and the developed world alike.

Looking at the present scenario, the nuclear technology finds itself in, we need a proactive two pronged strategy which safeguards the developmental aspirations that can inevitably be met by nuclear technology and at the same time prevents its malevolent use. This is an important challenge as ignoring either dimension could lead to disastrous consequences. With science and technology based collective wisdom at its command, I feel that this United Nations Organisation is in a unique position to find new paths that could significantly contribute to world peace and prosperity. We all need to work together in this important task. We owe it to humanity.

Thank you Mr. President.

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