

Founder's Day – 2011
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Address by

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Dear Colleagues,

I extend my warm greetings and compliments to all of you on the occasion of the 102nd birth anniversary of our beloved founder Dr. Homi Jehangir Bhabha. As is customary on this day, we take stock of the year gone by and rededicate ourselves for the cause of strengthening the Nation through various facets of our activities. As you know, our activities are directed towards meeting the national needs and priorities while maintaining excellence by global standards. The last year has been quite eventful with several achievements setting all time records in electricity generation, in nuclear fuel production and in reprocessing of spent fuel while facing some new challenges. I intend to share some of these with you in the next few minutes.

Since we met last year, construction of Unit 4 of Kaiga Generation Station was completed and it commenced commercial operation in January this year. With this we have 20 nuclear power reactors in the country with an installed capacity of 4780 MWe. The Unit 1 of KAPS was resynchronised with the grid after completing its upgradation including Enmasse Coolant Channel Replacement and Enmasse Feeder Tube Replacement.

The nuclear power generation during the year recorded an increase of about 40% over the previous year due to increased fuel availability, both indigenous and imported. In

particular, the average capacity factor is more than 80%, while that of 7 reactors has exceeded 90%.

Construction of four PHWRs of 700 MWe each at Kakrapar and Rawatbhata has been launched. The construction of the 500 MWe PFBR at Kalpakkam has attained 80 % completion.

In the field of uranium exploration, about 32,000 tonnes of additional uranium resources have been established enhancing the country's total uranium reserve to more than 1,72,000 t of U_3O_8 as on date. Tummalapalle uranium deposit in Andhra Pradesh is the flag bearer, which alone has contributed a staggering more than 60,000 t of U_3O_8 , up to a vertical depth of 500m, that too in the limited area of 15 km by 3km explored in detail so far. This stretch with a number of unexplored blocks, once explored up to its full potential may establish Tummalapalle as one of world's largest deposits. AMD has gone in a big way in Airborne geophysical exploration using Time Domain Electro Magnetic system covering more than 80,000 line Km during the year, in parts of Cuddapah, Kaladgi-Badami, Bijawar-Sonrai, North Delhi Fold Belt and Meghalaya Basins, which has identified favourable areas. Apart from uranium, AMD has also achieved augmentation of heavy mineral placer resources, rare minerals and rare metal resources.

The Tummalapalle Uranium Mining & Milling Project in Andhra Pradesh is nearing completion. Currently segment wise trials in the mill are underway and the mill is expected to be commissioned in the early 2012. Shaft sinking is nearly complete at the Exploratory Mining at Gogi in Karnataka. In the Mohuldih Uranium Mining Project in the Saraikela-Kharsawan district of Jharkhand, the decline has reached a depth of 50 m and the ore body has been intercepted.

At the Nuclear Fuel Complex, Hyderabad, all its plants have not only achieved the target production, but many of them have surpassed the targets and have established new production records. The Zirconium Complex at Pazhayakayal, in its first year of commercial operation has performed commendably. An all time high recovery exceeding 80 % has been achieved in production of PHWR fuel and significant reduction in consumables has been achieved in zirconium oxide production.

A 37 pin MOX Fuel test subassembly of PFBR was successfully irradiated in FBTR to a burn-up of 112.5 GWd/t against the target burn up of 100 GWd/t. The challenging task of circumferential butt welding of PFBR main vessel to roof slab of nearly 13 m diameter

was successfully completed. An engineering scale facility was commissioned for demonstration of pyro-processing of uranium on kg scale. The feasibility of producing ^{89}Sr in FBTR by irradiation of yttria was demonstrated and the separation of Sr-89 from irradiated yttria was carried out in hot cells. A unique mini sodium experimental facility was commissioned for sodium fire studies. The Interim Fuel Storage Building for PFBR fuel has been commissioned and handed over to NFC for manufacturing fast reactor fuel subassemblies. The success of the fast reactor programme hinges on building capacity for reprocessing of spent fuel for closing the fast reactor fuel cycle. Towards this goal, a project on setting up of Fast Reactor Fuel Cycle Facility is cleared by AEC and is awaiting Cabinet approval. Realising the importance of the development of fast breeding fast reactor fuel in the rapid growth of fast reactor programme, development of metallic fuel has been initiated. Just a few days back, the first set of Sodium bonded U-Zr alloy test fuel pins has been fabricated in a joint programme between BARC and IGCAR and assembled into a capsule for irradiation in FBTR. The capsules will be loaded shortly in FBTR for testing.

Performance of all the heavy water plants, has been excellent and the Heavy Water Board achieved more than 100% capacity utilization. High grade enriched boron produced by HWB is being regularly supplied to BARC for conversion in to boron carbide pellets for PFBR control rod application. About $2/3^{\text{rd}}$ of the total requirement of PFBR has already been met. At HWP, Baroda, a 130 MT per annum TBP plant has been commissioned and target production has been achieved. An industrial scale technology demonstration plant for recovery of uranium from phosphoric acid has been commissioned at RCF, Chembur. Towards alternate uses of Heavy Water and deuterium, laboratory scale preparation of D-labelled compounds is being continued at HWP, Baroda.

INDUS-2 Synchrotron has been operating regularly on round the clock basis at 2 GeV at 100 mA current. It has achieved beam life time of 20 hours. With the help of 30 kW RF power from solid state amplifiers developed indigenously, the INDUS operation has been enhanced to 2.3 GeV and 100 mA current.

The Homi Bhabha National Institute has completed five years of its existence. During the last year, more than 100 degrees and diplomas were awarded. In the Ph.D.

programme more than 50 students completed their academic requirements. The number of enrolments has increased to nearly 3000 including more than 1200 for Ph.D.

I am happy to inform you that the Government of Tamil Nadu has recently allocated land for the India based Neutrino Observatory programme in Theni district near Madurai. This will immensely help the High Energy Physics Community to achieve their cherished goal of setting-up this unique underground laboratory.

This year in March, Japan was hit by a twin tragedy in the form of an earthquake of level 9 on the Richter scale followed by tsunami of unprecedented height causing wide ranging damages to human lives and property. The tragedy was followed by accidents in four of the 10 nuclear power reactors located at Fukushima. After the accident at Fukushima, Prime Minister of India had underlined that safety of nuclear power plants is a matter of highest priority for the Government while implementing the national nuclear programme. Several steps have been taken in this regard and many of the recommendations of the safety reviews conducted by the NPCIL task forces and by AERB have already been implemented. A road map has also been prepared for implementing the remaining recommendations. It has been decided to invite IAEA missions, namely, Operational Safety Review Team (OSART) and Integrated Regulatory Review Service (IRRS), for peer review of safety of nuclear power plants, and of the regulatory system, respectively. The emergency response and preparedness measures have been further strengthened in all our nuclear facilities. A bill to confer statutory status to the national safety regulatory authority has been introduced in the Parliament.

We are coming to the end of the XI 5-year plan. The total outlay of the XI plan was around Rs. 46,000 Crores. Many of the projects in the XI plan have been completed and some of them are being continued in the next plan. We are currently finalising the proposals for the XII Plan. The emphasis while preparing the XII plan proposals has been – pursuit of multiple reactor technologies, safety upgrades to address beyond design basis external events, increased emphasis on applications of nuclear technology for societal benefits, outreach programmes to enhance public acceptance and strengthening of linkages with universities and national laboratories.

During the year, India has entered into bilateral agreement with Republic of Korea for cooperation in peaceful uses of Atomic Energy. Global Centre for Nuclear Energy Partnership being set up at Bahadurgarh, Haryana will focus on development of

proliferation resistant reactor technologies, nuclear security technologies, radiological safety and radiation technology applications. DAE also signed tripartite MoU with IAEA and Government of Namibia for supply of a Bhabhatron Tele-therapy machine to Namibia. An Implementing agreement between DAE and DOE, USA was signed for corporation in the area of accelerator and particle detectors R&D for discovery science.

Dear colleagues,

I have just highlighted some of the major achievements that have been accomplished by the Department during the last year. Through your dedicated and untiring efforts, the Department of Atomic Energy, is pursuing its programme with full vigour and has been successful in realising most of the dreams our founder Dr. Bhabha. If you recall, while talking to you last year from this very podium, I had painted a scenario of our future and had mentioned that we will have to convert this scenario into a reality. This scenario included large scale deployment of nuclear science and technology in sectors like nuclear power including the entire fuel cycle, food security, health care, national security and research opportunities to fresh talents in the country. We are in fact poised to move forward in all these areas.

Similarly in the global arena, Nuclear power plants all-over-the world recorded a very impressive performance in the last three decades. The resurgence of nuclear power has been in the horizon in many countries. After the Chernobyl accident which occurred a quarter of Century back, the confidence in the safety of the nuclear power plants was building up in the minds of people. At this juncture, the Fukushima accident has shaken the confidence on the safety of nuclear power plants when exposed to an external event of a very high magnitude. We are now facing a new challenge to restore this confidence. Safety statistics is all in favour of nuclear industry as we may recall that the world has logged 14000 reactor years of nuclear electricity generation in about 30 nations. Major accidents and casualties caused are far fewer when compared to any other energy generating technology over a sustained period. India has recorded over 350 reactor years of safe operation of nuclear power plants with only one event, namely Narora fire which was of level-III on IAEA event scale. In Fukushima, there has been no casualty due to radiation exposure though the total causality in Japan exceeded 20,000 due to earthquake and tsunami. These statistics will not satisfy a common man and it is our duty

to explain issues related to safety of nuclear power plants and to regain their confidence. We must ensure that nuclear installations have no adverse impact on the livelihood of the people around while they can bring about significant improvement in the quality of life of the people in the region and an all-round development of the country.

Let me do a loud thinking on how to enhance our outreach programme so that a greater appreciation comes from our neighbourhood in all our operating as well as our proposed plant sites. First and foremost, we must integrate ourselves with the people around. To achieve this, it would be necessary for us to be proactive in providing education, healthcare and other social services in the neighbourhood, participation of large number of our scientific and other staff in the neighbourhood activities, initiating our departmental activities having social relevance such as nuclear agriculture, food preservation, waste-to-wealth programme, etc. for the benefit of the people. I must mention here that several such activities are already in place in many of our operating plant sites. What is needed is to multiply them manifold so that the benefit reaches a much larger community.

We have our own education and healthcare programmes. Though difficult, but it may not be impossible to extend some of these facilities at least to a limited number of people in the neighbourhood. Such an enormous task cannot be fulfilled unless all of us including our family members take interest in the activities having social relevance. We do have structured programmes such as education through our Atomic Energy Education Society, healthcare through the medical facilities, providing extra-mural support through Board of Research in Nuclear Sciences, development of neighbourhood through AKRUTI, links with educational institutions, agricultural programme through distribution of radiation mutated seeds for multiplication and management of municipal waste. For an inclusive growth of neighbourhood, there is a need to intensify these activities to a great extent and that is possible only if all of us participate in social service and awareness programmes. On the occasion of Founder's Day, I make an appeal to all of you in this regard and I can assure you that by involving ourselves in imparting education, supporting healthcare facilities, helping employment generation and most importantly integrating ourselves with the local population will enrich our own lives and we will achieve a sense of fulfilment over and above our professional accomplishments.

Let us therefore, on this auspicious day, rededicate ourselves to the cause of nation building through the nuclear energy programme and meet the great aspirations of our fellow countrymen. This would in fact be the most fitting tribute to our founder Dr. Homi Bhabha and other pioneers of our programmes.

Thank You

Jai Hind.