

International Atomic Energy Agency

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Statement by Dr. Ratan Kumar Sinha,  
Chairman of the Atomic Energy Commission

and

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**Mr. President, Excellencies, Ladies and Gentlemen,**

Mr. President, I take this opportunity to congratulate you, on your election as the President of the 59<sup>th</sup> General Conference. Under your leadership, I am sure the current General Conference will accomplish all the tasks laid before it.

India welcomes the three new Members to the IAEA, and I take this opportunity to congratulate Antigua & Barbuda, Barbados, and Turkmenistan on the occasion of their joining the IAEA family.

**Mr. President,**

I am happy to share some highlights of the progress achieved in the Indian nuclear programme, since the previous General Conference.

Our utility, Nuclear Power Corporation of India Ltd. (NPCIL), has achieved the highest ever generation of electricity in the financial year 2014-15, with a Capacity Factor of about 82% and Availability Factor of 88%.

The first unit of the Kudankulam Nuclear Power Plant (KKNPP 1), built in collaboration with the Russian Federation, started commercial operations from December 31, 2014, taking the country's installed nuclear power generation capacity to 5780 MWe. The second unit at Kudankulam is in an advanced stage of commissioning.

Indian nuclear power plants continue to register records of long continuous runs. Recently, Narora Atomic Power Station Unit-2 crossed 500 days of uninterrupted operation and is continuing to operate. Till date, the Indian nuclear power reactors have recorded continuous runs exceeding one year on twenty occasions.

Following the completion of construction of the 500 MWe Prototype Fast Breeder Reactor (PFBR), its commissioning is in progress. At present the reactor is gearing up for loading its coolant – sodium.

Construction work is progressing on four indigenous 700 MW Pressurised Heavy Water Reactors. In addition, 16 reactors of similar capacity are planned to be set up in already identified locations. Plans for further expansion of nuclear power generation capacity through imported LWRs are progressing and techno-commercial negotiations with identified vendors, including localisation of manufacture involving Indian industries, are underway.

**Mr. President,**

The performance of several Indian fuel cycle facilities continues to reach higher levels every year. At the Nuclear Fuel Complex (NFC) the annual production of nuclear fuel for PHWRs achieved an increase of 30% over the production figures for the previous year. Annual domestic production of uranium also recorded its highest ever figure.

In my Statement to the General Conference last year, I reported on the technology developed for the removal of Caesium-137 and its conversion to vitrified pencil sources for low-dose rate applications. During the current year, we have separated large quantity of Caesium-137 from High Level Liquid Waste (HLLW) using an indigenously developed process, and the first lot of pencils of vitrified Caesium-137 was produced at the Bhabha Atomic Research Centre (BARC) and delivered to the Board of Radiation and Isotope Technology (BRIT) for use in the indigenous blood irradiators. This technology is being used for the first time in the world in commercial domain.

India continues to attach high priority to all aspects of Thorium related reactor and fuel cycle technologies. In the month of January this year, the newly constructed Power Reactor Thoria Reprocessing Facility (PRTRF) started the reprocessing of thorium oxide fuel bundles irradiated in our PHWRs earlier.

India is hosting the International Thorium Energy Conference (TheC15) in Mumbai next month.

**Mr. President,**

Our State-owned General Insurance Corporation-Reinsurer (GIC-Re) and several other Indian insurance companies came together in June 2015 to launch an Indian Nuclear Insurance Pool (INIP). The INIP will initially launch the insurance product for NPCIL to cover the operator's liability under the provisions of the Civil Liability for Nuclear Damage (CLND) Act 2010. A separate product will be subsequently launched to cover the risks of the suppliers under this Act. This is expected to address liability related concerns of national as well as international suppliers.

**Mr. President,**

In March this year, the IAEA's Integrated Regulatory Review Services (IRRS) mission conducted the peer review of the nuclear power related regulatory activities of the Atomic Energy Regulatory Board (AERB). The IRRS team appreciated the AERB's actions and initiatives taken as a follow-up of the Fukushima accident related reviews, and identified a number of good practices, recommendations and suggestions. We are in the process of implementing those recommendations and suggestions.

India greatly values its association with the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO). India believes that the INPRO methodology provides an important tool for the evaluation of new advanced safety features of the next generation nuclear power plants.

**Mr. President,**

In the opening session of this Conference, DG, IAEA made an important statement highlighting the role of nuclear in addressing the green house gas emission and

associated climate change. Indeed, from this perspective, nuclear power has to be a very prominent component in the global energy-mix to meet the growing energy demands of the world. In order to facilitate assessment of a country specific optimum energy mix, it is, however, important to address the question of system-effects, in particular those arising out of grid-connected variable energy sources, along with mainly base load energy sources such as nuclear. Such system-effects may have an impact on reliability and long term economic viability of such energy systems. The IAEA may consider facilitating the development of a standard methodology to assess the aforementioned system-effects.

**Mr. President,**

During the last decade, Gamma-Ray Astronomy has emerged as an important tool for understanding the high energy processes in the Universe. India is setting up one of the largest gamma-ray telescopes MACE (Major Atmospheric Cherenkov Experiment) at Hanle, a high altitude (4200m above the sea level) astronomical site in the Ladakh region of North India.

The Indus-2 synchrotron radiation source at Raja Ramanna Centre for Advanced Technology at Indore has been operating round the clock. With the commissioning of a soft X-ray reflectivity beamline, the total number of operational beamlines on Indus-2 has increased to thirteen. As a result, the number of researchers and students using the Indus beamlines has doubled over the past two years.

In the field of fusion science, Steady State Superconducting Tokamak (SST-1), at Institute of Plasma Research (IPR), Gandhinagar, Gujarat, has become operational with repeatable plasma discharges up to ~ 500 ms duration and plasma currents in excess of 60 kA. SST-1 is the only tokamak in the world, where the superconducting Toroidal Field Magnets are operated in two-phase helium demonstrating reduced cold helium consumption.

**Mr. President,**

Nuclear applications beyond power and associated technologies, in the area of health-care, water, industry and environmental protection continue to expand, delivering important benefits to our society.

India appreciates the Director General of IAEA for choosing the theme of 'Atoms in Industry: Radiation Technology for Development' for the Scientific Forum this year. India has a large programme in this area, and has also been the Lead Country in the Industry sector for the IAEA Regional Cooperation Agreement (RCA) Programme for several cycles. In this context, I would like to draw your attention to the exhibition set up by India on our indigenous technological capabilities and contributions in the development of industrial applications. I cordially invite all delegations to visit our exhibition in the Rotunda.

India has been a strong advocate of the IAEA's Programme of Action for Cancer Therapy (PACT). Tata Memorial Centre (TMC), an autonomous institution under DAE, provides the most appropriate and cost-effective technologies in implementing cancer care programmes, most suitable for developing countries consistent with their infrastructural resources.

Objective staging of cancer is crucial for deciding on effective treatment options. TMC, along with the IAEA and RCA, has developed a smart phone App for Cancer Staging. This TNM (Tumour, Node, Metastasis) App will facilitate harmonised communication approach among the multi-disciplinary team in staging of patients, and in turn, delivering better cancer care to patients. As I speak, the App is being launched in a GC side-event organised by IAEA and the Embassy of India. We thank IAEA for the opportunity given to India to contribute to this important development of high value for all countries.

**Mr. President,**

As part of implementation of the Arrangement with the IAEA concerning India's voluntary contribution to the Nuclear Security Fund, the services of an Indian cost-free expert in information security are being provided to the Division of Nuclear Security of the IAEA.

In the same context, and under the auspices of the Global Centre for Nuclear Energy Partnership (GCNEP) initiative, training events were conducted covering the topics on "Natural Circulation Phenomena and Passive Safety Systems in Advanced

Water Cooled Reactors”; “Vulnerability Assessment for Nuclear Material Security”; “Information and Computer Security for Nuclear Facilities”; and “Physical Protection of Nuclear Material and Nuclear Facilities”.

India continues to actively participate in Regional Cooperation Agreement (RCA) Programmes of IAEA making significant contributions. In the last one year, two RCA-related events were hosted by India, in which 22 IAEA Member state delegates participated. The services of several Indian Scientists and Engineers were made available to the Agency to carry out the expert assignments.

India also continues to participate in a large way in the IAEA’s Co-ordinated Research Programmes (CRP’s). Currently, Indian institutions are engaged in 65 CRPs. India hosted a 6-day IAEA Inter-regional Training Course related to production of Molybdenum-99, and will be hosting two more events in November this year.

India appreciates the efforts of the DG of IAEA in modernising the nuclear applications labs in Seibersdorf and the progress made in the ReNuAL project. I am pleased to inform that our Government has proposed a voluntary contribution of 100,000 US dollars for the ReNuAL project.

**Mr. President,**

I have been keeping the General Conference informed about the Indian studies on the health effects of low dose radiation. I wish to update that the Department of Atomic Energy is continuing its extensive studies on the biological and health effects of low dose and low dose rate radiation in the high level natural radiation areas (HLNRA) of Kerala coast. The findings do not reveal any effect of this high level radiation on human population residing in this area.

Apart from epidemiology, biological studies in human peripheral blood mononuclear cells using end points such as chromosome aberration, micronuclei, telomere length and DNA strand breaks did not show any dose response. Furthermore, and most interestingly, radio-adaptive response studies revealed significant reduction of DNA strand breaks in HLNRA individuals, even with higher challenging doses. Repair

kinetics showed fast and efficient repair of DNA strand breaks in HLNRA individuals, as compared to individuals from normal level natural radiation areas (NLNRA) suggesting in vivo adaptation. Global gene expression analysis revealed abundance of differentially expressed DNA damage response and repair genes in HLNRA individuals, in response to chronic low dose radiation exposure.

Further scientific studies on DNA damage and repair at low and high doses are underway using double strand break specific markers. Investigating the role of adaptive response and gene regulation is in progress to delineate the mechanistic effect of low dose radiation, which has important implications for radiation protection science and human health.

I once again suggest that the IAEA should take the lead in this direction, along with other international bodies, by organising scientific discussions to arrive at a consensus on the current state of understanding on the effect of low dose radiation on human health, and identify any residual gap areas that need further research.

**Mr. President,**

The 59th session of IAEA General Conference is taking place four and half years since the Fukushima - Daiichi nuclear accident. IAEA has commendably brought out its report on the accident describing what went wrong and the lessons one can draw for the future. It is time that we move beyond the shadows of Fukushima and work to harness the true potential of nuclear energy as a credible and affordable energy resource to lead the world to a greener growth path. We count on IAEA's leadership to realise that vision.

**Thank you Mr. President.**