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Chairman PAEC Addresses 63rd IAEA General Conference



Chairman PAEC Addressing the 63rd IAEA General Conference at Vienna

Pakistan lauded IAEA efforts made for achieving sustainable development goals using nuclear technology by Chairman Pakistan Atomic Energy Commission, Mr. Muhammad Naeem while addressing the 63rd IAEA General Conference (GC) as head of Pakistan delegation. In his address Chairman PAEC expressed deep sorrow over the sad demise of H. E. Yukiya Amano. He further added that Mr. Amano's leadership role in steering the Agency in accordance with its statute and in pursuit of the agenda of Atoms for Peace and Development will always be remembered.

He expressed that Pakistan would continue to utilize the enormous potential of nuclear technology for the socio-economic development of the country and to achieve the UN Sustainable Development Goals (SDGs). Nuclear technology applications are being used in diverse areas of electricity generation, health, agriculture, hydrology, industry, environment and basic sciences, he added. Many developing countries, including Pakistan, remain vulnerable to adverse impacts of Climate Change, he added, "The IAEA should continue promoting the development and use of nuclear technology in mitigation, monitoring and adaptation in this field". This year during the General Conference, Pakistan also participated in the exhibition held in IAEA Hqs, to showcase the work it has undertaken in

peaceful uses of nuclear science and technology.

In his statement the Chairman told that Pakistan is currently facing a severe energy crisis, the decision to expand nuclear power programme is hardly a matter of choice for Pakistan. The nuclear power generation provides a cleaner, cheaper and more sustainable alternative for energy security. Pakistan has been reaping the benefits of nuclear power since 1972 in a safe, secure and safeguarded manner. Currently, five nuclear power plants are in operation and two more of 1100 MWe each, near Karachi are expected to be connected to the national grid in coming years. All civilian nuclear facilities in Pakistan are under IAEA safeguards without any exception, he added.

Chairman also informed that Pakistan's national goal is to expand nuclear energy capacity to 40,000 MWe as envisaged in National Nuclear Energy Vision 2050. In order to meet this target, Pakistan looks forward to the removal of the barriers for gaining equitable and non-discriminatory access for the international civil nuclear cooperation.

He told the audience "In the vital area of nuclear medicine, eighteen Nuclear Medical Centers focusing on cancer treatment are working under Pakistan Atomic Energy Commission and two more are under construction. These hospitals serve nearly one million patients each year. "We

continue to believe that the choice of nuclear technology rests with the Member States and the IAEA's facilitation role is extremely important in this regard", he told.

Chairman PAEC appreciated IAEA's Technical Cooperation Program, in which Pakistan has always participated actively for mutual benefits and continues to remain a major beneficiary of the Programme. Pakistan strongly supports ensuring sufficient, assured and predictable resources to carry out Agency's statutory responsibilities "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world". The Agency can play a unique role in promoting nuclear technologies for pursuit of Sustainable Development Goals (SDGs). He said that IAEA should continue to play its due role in coordinating international efforts to strengthen nuclear safety and security.

"Nuclear security is a 'State Responsibility' and In Pakistan, we have developed a comprehensive nuclear safety and security regime. It is regularly reviewed and updated in the light of IAEA guidance documents and international best practices".

The Pakistan Nuclear Regulatory Authority (PNRA), set up in 2001 enjoys complete independence. PNRA continues to review and update its regulations in light of extensive National experience and IAEA standards. During preceding year three additional regulations were issued to this effect. In pursuit of safe use of nuclear technology, PNRA is building capacity of other embarking countries, and has recently concluded an agreement with Nigerian Regulatory

Authority under IAEA aegis.

Pakistan has also developed "Regulations on Physical Protection of Nuclear Material and Nuclear Installation (PAK/925)", which are based on IAEA nuclear security recommendations contained in INFCIRC/225/Rev5.

Pakistan's Centre of Excellence for Nuclear Security (PCENS) has grown into a regional and international hub for nuclear security training and has conducted various IAEA courses with participants from over 45 countries.

As a further demonstration of Pakistan's commitment towards nuclear security, Pakistan has recently joined Nuclear Security Contact Group by subscribing to INFCIRC/899 and subscribes to IAEA's Supplementary Guidance on Management of Disused Radioactive Sources. Moreover, Pakistan is also actively considering undertaking an IPPAS Mission at the earliest opportune time.

Chairman PAEC mentioned that this year Pakistan had the privilege of welcoming Mr. Mikhail Chudakov, DDG Nuclear Energy. DDG NE visited two nuclear power plant sites in Pakistan and highly appreciated the professional competence of trained manpower and safety and security measures being taken at country's facilities.

He concluded by highlighting that Pakistan stands ready to further strengthen its partnership with the IAEA and will continue to contribute to the Agency's efforts to build capacity in other countries, inter alia, by providing experts and services.

PAEC-IAEA Safeguards Bilateral Meeting

A high profile delegation from IAEA visited Pakistan for convening PAEC-IAEA Safeguards Bilateral Meeting from 10-11 October 2019 at PAEC HQs, Islamabad. The delegation comprised of Mr. Massimo Aparo, Deputy Director General IAEA Safeguards, Mr. Van Zyl. de Villiers, Director IAEA Safeguards, Mr. Teshome Bayou Temesgen, Section Head Operations, IAEA Safeguards and Ms. Maria Vez Carmona, Section Head Legal Affairs IAEA.

IAEA conducts Safeguards Bilateral Meeting with its Member States having substantial Safeguards activities to deliberate upon Safeguards issues in the States. PAEC-IAEA Safeguards Bilateral Meetings are being held, between PAEC Safeguards Authority and IAEA Safeguards Department, every four years since year 2011 and it was 3rd meeting in the sequel. The delegation from PAEC was led by Director General (International Affairs, PAEC Hqs).

The scope of meeting covered the progress and development in the area of Safeguards for seamless continuity of implementation, address outstanding issues, finalize proposals of approaches for upcoming facilities, review the status of different phases of facilities subject to IAEA Safeguards for the purpose of Design Verification, foresee various challenges in the light of Safeguards obligations and combining the efforts to increase productivity, efficiency & effectiveness in modernization of Safeguards technology and methods.

Various preparatory meetings along with the rigorous

consultative processes between the Safeguards Division of PAEC and the stakeholders were conducted in order to develop nuclear Safeguards Posture of Pakistan. As a result of it the Safeguards Bilateral Meeting was concluded with very productive outcome. The meeting was followed by a site visit to K-2/K-3 and KANUPP Spent Fuel Dry Storage Facility, Karachi on 11th October, 2019.

The Agency appreciated the non proliferation efforts of Pakistan and acknowledged every step taken by PAEC in this regard. PAEC management accentuated the long history of relation between PAEC and IAEA on Safeguards implementation.



Participants of PAEC-IAEA Safeguards Bilateral Meeting

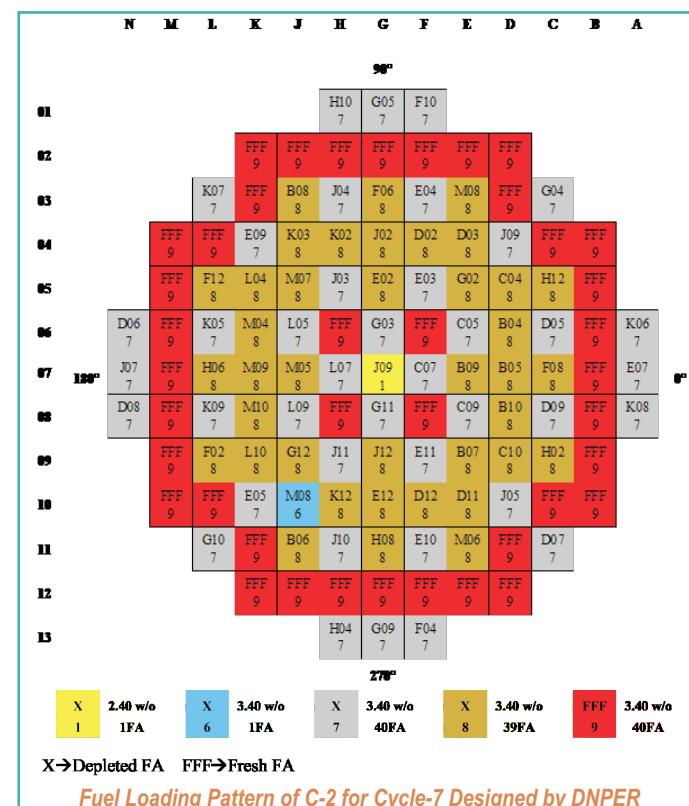
DNPER Designs Indigenous In-Core Fuel Loading Pattern for Chashma Nuclear Power Plant Unit -2

The design of fuel loading pattern for each core cycle of Pressurized Water Reactors (PWRs) is a specialized high-tech job, which requires extensive analyses of nuclear and thermal-hydraulic performance of reactor core, optimized fuel utilization (burn up) and ensuring reactor safety throughout fuel cycle. The axial and radial power peaking must be in the safe limits throughout the core cycle; control rods withdrawal limits must be within acceptable range as defined in reactor core Technical Specification document; moderator temperature coefficients must always be negative. For the initial cycles of CNPGS units, Chinese Nuclear Design Institute (SNERDI) used to provide the fuel loading patterns design (LPD) under contract with CNPGS.

However, Directorate of Nuclear Power Engineering Reactor (DNPER) has acquired full design capability in this important area. DNPER signed an independent Fuel Management Contract with CNPGS in 2018, under which, DNPER is responsible independently for the design of emergency loading patterns of all CNPGS units (C-1, C-2, C-3 & C-4) and for the provision of third party review for normal fuel loading pattern design of each cycle designed by SNERDI, as per regulatory requirement. Emergency loading pattern design is on the critical path of reactor refueling outage (RFO) and must be completed reliably within a very limited time period. Provision of emergency loading pattern design becomes mandatory in case of failure of one or more fuel assemblies which are proposed to be loaded for the next reload. Under the requirement of emergency reload design by CNPGS, DNPER has independently provided the fuel loading pattern designs for different cycles of C-1 and C-2 in the past. The successfully safe and optimized operation of C-1 & C-2 based on these indigenous emergency fuel management plans has enhanced the credibility and authenticity of DNPER's design capabilities. It is worth mentioning that the emergency loading pattern designed by DNPER has been selected and employed by CNPGS for cycle-7 of C-2 based on design results which exhibited better fulfillment of reactor safety criteria. For this job, DNPER has provided all the

design reports and documents to CNPGS to demonstrate the burn-up optimization and safety of the plant. In addition, DNPER also provides regular fuel management plans for all fuel cycles of all CNPGS units. The indigenous achievement in fuel management design by DNPER is a significant step forward towards the indigenization of fuel management of nuclear power plants.

Based on these capabilities, DNPER now serves as the Expert Centre for Reactor Fuel Management for the operating power plants thereby saving substantial amount of foreign exchange for each reload.



Fuel Loading Pattern of C-2 for Cycle-7 Designed by DNPER

PIEAS Faculty wins Best Research Paper Award

Dr. Aneela Zameer, Professor at Department of Computer and Information Sciences, PIEAS, has been awarded Best Research Paper Award 2017 in the ceremony conducted on August 07, 2019 for her paper "*Intelligent and robust prediction of short term wind power using genetic programming based ensemble of neural networks.*"

This paper was published in well reputed ISI-indexed journal of Energy Conversion and Management with an impact factor 7.181 with total citations of 56 so far. The issue arises due to inherent fluctuations in the wind and therefore mismatch of wind power production and electricity demand, which leads to inadequate integration into national grid. Clean and green renewable source of energy can be better utilized with precise wind power prediction. In this paper, Machine Learning based techniques have been proposed and implemented to predict wind power in advance. The results have been compared with other published

techniques and demonstrate much lower prediction error and better and precise wind power forecast.



Prof. Aneela Zameer receiving her award on 7th Best Research Paper Award Ceremony at HEC

NCNDT Provides Third Party Inspection Services to UCH Power Station Unit # 1 & 2

The National Centre for Non-destructive Testing (NCNDT) of Scientific and Engineering Services (SES) Directorate regularly provides Third-Party Inspection (TPI) services to different organizations in the country including Independent Power Producers (IPP's). Third party inspection is an activity carried out by qualified inspectors on behalf of the owner, contractor or material supplier and effectively contributes to the success of a project by ensuring quality and reducing needless delays, costs, general disruptions and rifts between owners, contractors and material suppliers.

Recently a team of NCNDT visited the Uch Power Station Unit # 1 and 2, Dera Murad Jamali Baluchistan to provide third party inspection (TPI) services during plant shut down. NCNDT is providing TPI activities to UCH Power Station every year since 2002. NCNDT team was responsible to conduct audit and control of NDT contractor's activities, review of NDT results of contractors, preparation of summary of NDT results and preparation of defect track sheet based upon NDT reports and previous inspection history.

Our team of experts performed TPI of different components of boilers including Heat Recovery Steam Generators (HRSG), Low Pressure (LP), Intermediate Pressure (IP) & High Pressure (HP) Drums, Air Receiver Tank, Fuel Scrubber, Hydrogen Vessel, Miscellaneous Drain Tank,

Deaerater Vessel and Feed Water Storage Tank. The team monitored Magnetic Particle Testing (MT), Penetrant Testing (PT) and Ultrasonic Thickness Measurement (UTM). On Unit # 1, the inspection activities were performed by SGS Pakistan (Pvt) Ltd while on Unit # 2, were performed by M/s Inspectest (Pvt) Ltd. For both the Units, all activities as per scope of TPI were successfully completed. Uch Power management highly appreciated the NCNDT for its performance.



Third-Party Inspection activities on Feed Water Tank

WANO OE CARAVAN

Direktorat of Nuclear Power Operations (DNPO), PAEC in collaboration with World Association of Nuclear Operators (WANO) Tokyo Centre conducted a WANO Member Support Mission on "WANO OE Caravan" at PAEC Guest House Islamabad from 5-7 November 2019. WANO Support Mission comprised Mr. Tsutomu Takahashi, Team Leader, Mr. Naoto Kameyama, Expert and Mr. Muhammad Atiq PAEC's liaison engineer at WANO Tokyo Centre. More than 15 participants from Chashma Nuclear Power Generating Station, KANUPP, DG (NPP) and DNPO attended the Caravan. The major topics presented during

the mission included WANO OE reporting indicators and current OE status, trending and analysis of OE reports, overview of WANO Significant Operating Experience Reports (SOERs) implementation status and SOERs on Operators Fundamental Weaknesses and Risk Management Challenges. With these presentations and mutual discussions, the participants had the opportunity of learning WANO OE program and sharing their expectations and experiences. Finally, WANO team leader thanked PAEC for its hospitality and preparation in hosting the OE Caravan.



Participants at WANO OE Caravan

NIAB Celebrates world Food Day- 2019



Participants of the 7th Farmers' Day organized by NIAB at Shadiwal (Sialkot)

The World Food Day is observed annually on 16th October among all the states under the canopy of United Nation. The theme every year may vary but the crux all the time is to promote worldwide awareness and responsibility to combat hunger and to strive for the provision of good, healthy and nutritious food to all. Focusing on the theme for 2019 "Our actions are our future healthy diets for a zero-hunger world" Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad celebrated this day, enthusiastically. The venue was a Village, Shadiwal (Sialkot). Around 150 farmers were invited and the event was tribute as the 7th Farmers' Day under the title "Awareness for food safety and safe usage of veterinary drugs and pesticides in animals and plants." Various lectures on animal feed and nutrition, diseases and related vaccines and useful reproduction strategies were delivered by a group of scientists from NIAB. A progressive farmer, Malik Sana Ullah Awan inaugurated the event.

In the inaugural address, the Chief Guest appreciated NIAB for playing its role in a prompt and precise manner for spreading awareness to the stakeholders and introducing new crop varieties to make Pakistan self-sufficient in the field of agriculture. Dr. Tariq Mehmood Shah, DCS/Head PB&GD presented an overview about R&D activities of the Institute, and invited the farmers to visit NIAB. The event coordinator, Dr. Uzma Maqbool highlighted the hazards due to misuse of antibiotics and hormones; she suggested useful practices for better health and production of safe food from treated animals.

Later, a special "Question/Answer" session was also arranged to facilitate farmers facing different problems. The programme ended with a vote of thanks by the Head Animal Sciences Division, Mr. Mujahid Hussain.

Cancer-Ward Foundation Stone Laying Ceremony at NIMRA

NIMRA is among the 18 Atomic Energy Cancer Hospitals that are providing diagnostic and treatment facilities mainly to cancer patients. However NIMRA did not have its own indoor ward since its inception. The patients have been admitted in cancer ward-17 provided by Liaquat University Hospital, Jamshoro in its premises that was bothersome for the patients as well for NIMRA authorities due to administrative and security issues. So there was always a need for NIMRA's own indoor ward in its vicinity for the patients coming from far flung areas for their treatment. A PC-1 for 100-bed NIMRA Cancer Ward was approved in 2018 that consisted of latest indoor facilities, OPD blocks for Oncology and Nuclear Medicine, new administration block, conference hall & a library. LUMHS, Jamshoro donated land for this double storey building. Provincial Govt. of Sindh is providing financial support worth 282.211 million PKR while the execution of project will be carried out by WASO, PAEC.

NIMRA Cancer Ward Foundation Stone laying ceremony was held on August 06, 2019. Prof. Dr. Bikha Ram Devrajani, Vice Chancellor LUMHS, Jamshoro laid down the foundation stone of this cancer ward. It was followed by formal inaugural ceremony at NIMRA. In his welcome address, Dr. Syed Shahid Iqbal, Director NIMRA highlighted the dire need of this ward. In addition to VC LUMHS, the

ceremony was attended by Dr. Naeem Ahmed Laghari, former Director NIMRA Jamshoro, Dr. Muneer Ahmed Junejo, Pro- Vice Chancellor LUMHS and other faculty members of LUMHS, Jamshoro. The participants appreciated the efforts of NIMRA team for their hard work and wished them success in this and future endeavors.



Prof. Dr. Bikha Ram Devrajani Vice Chancellor LUMHS alongwith Dr. Syed Shahid Iqbal, Director NIMRA, Jamshoro unveiling the plaque of foundation stone at NIMRA

QA Oversight of Establishments/Projects

The Directorate of Quality Management (DQM) carried out QA oversight of various establishments/ projects of PAEC through conduct of planned QA Gap Analysis, QA Audits & QA Surveillance. During this quarter Gap Analysis of four (04) PAEC establishments in line with relevant applicable Codes & Standards was conducted. DQM officials also participated in critical activities of RFO-2 of C-3.

The DQM conducted QA Audits of Karachi Nuclear Power Plant-1 (K-1) and PAEC General Hospital Islamabad (PGHI)

and the grey areas have been highlighted for bringing continual improvement in their Management System. In addition to routine QA Audits, DQM has been assigned to organize Performance Audits of various PAEC organizations to assess their activities with regards to Economy, Efficiency and Effectiveness (3Es). During this quarter, two Performance Audits were conducted by the team (approved by Chairman PAEC) comprising of experts from multi-disciplinary fields i.e. Finance, HRD, QA and related area being audited.

Enhancement of Quality Culture in PAEC Establishments

The Directorate of Quality Management (DQM) is striving to bring Quality Culture in PAEC through extensive QA Awareness Training Programs. In order to cope up with changing needs of Quality and to upgrade the knowledge of PAEC professionals, DQM has conducted following training courses in the third quarter of year 2019.

- 4th Course on QMS Requirements & Implementation (IAEA based) attended by thirty-one (31) Participants from various establishments.
- 6th & 7th Course on QMS Auditor Certification (IAEA based) attended by forty-one (41) participants from various PAEC Establishments.
- 9th QA Course for Staff 32 Staff members from HMC-3 participated.
- The DQM is committed to provide consistent support &

consultancy services for developing, Implementing and maintaining the Quality Management Systems (QMS) in respective PAEC Projects/ Establishments.

Three (03) PAEC establishments i.e., DQM, Islamabad, CAFD & HPD (PINSTECH) have been awarded ISO 9001:2015 certificates by third Party Certification Body (M/s CeSP) after successful completion of their Stage-2 Certification Audits through the active support and Coordination of Consultancy Services of the DQM.

Stage-2 Certification audits of five (05) PAEC establishments including WASO, PARAS, IPD (PINSTECH), NIFA & CENUM have been conducted recently and their certificates will be received soon from the Certification Body.

Efforts are also being made for ISO 17025/17020 Accreditation of three (03) Labs of DNPER, NIBGE & NIFA through PNAC.

DNPO organizes One- day Training on Risk Management

The Directorate of Nuclear Power Operations (DNPO) organized a one-day training course on Risk Management on 19th October 2019. The training was conducted in view of one of the WANO Executive Support Mission recommendations to develop a Risk Management program at corporate level. Two well-qualified experts Mr. Naeem Ahmed Subhani (Head of Health Safety Security and Environment (HSSE) Department at Kuwait Foreign Petroleum Exploration Company (KUFPEC) and President of American Society of Safety Professionals, Pakistan

Chapter) and Mr. Muhammad Mehmood Khan (HSSE officer at KUFPEC, Vice-President of American Society of Safety Professionals, Pakistan Chapter) provided the training. Both experts have vast experience in the field of Industrial Safety and Risk Management. There were 21 participants from corporate offices and plants (C-1, C-2, C-3, C-4 and KANUPP). This training was a successful endeavor to move forward in developing Risk Management program at PAEC power setup.



A group photo of the participants

Pakistani Stall at IAEA Exhibition

Pakistani Stall at IAEA Exhibition, held from 16-20 September, 2019 at the sideline of 63rd General Conference (GC) of IAEA, was inaugurated by Chairman Pakistan Atomic Energy Commission, Mr Muhammad Naeem. The event was attended by senior officials of the IAEA and delegates from around the globe.

The IAEA Exhibition is held every year during IAEA GC. Pakistan showcased applications of nuclear science and technology in achieving Sustainable Developing Goals (SDGs) which is also important for development of the country. Pakistan participated this year in the IAEA exhibition for the second time after 2013.

Speaking on the occasion, Chairman PAEC, Mr Naeem said "Pakistan is actively engaged in IAEA projects for achieving

sustainable development goals". He said that PAEC started its programme by establishing centers for agriculture and radiotherapy.

PAEC has developed 18 cancer hospitals catering around eight hundred thousand patients per year. Pakistan's Ambassador in Austria, Mr Mansoor Ahmed Khan also spoke on the occasion. He appreciated PAEC for establishing Pakistani Stall. He said that Pakistan is using nuclear technology for peaceful purposes.

The IAEA General Conference continued till 20th September and so did the exhibition, a sideline event for the awareness of IAEA dignitaries and delegates of other IAEA member states.



Pakistan Atomic Energy Commission Exhibition Team at IAEA



Chairman PAEC inaugurating the Pakistani Stall



DDG, IAEA showing keen interest in cotton plant at Pakistani Pavilion

Pakistan Signs Country Program Framework Agreement with the IAEA

During 63rd General Conference (GC) of IAEA, signing ceremony of the Country Program Framework (CPF) for next 5 year was also held in the IAEA, Hqs. IAEA's DDG, TC and Chairman PAEC signed the agreement. This is the four CPF of Pakistan developed with various stakeholders to meet sustainable development goals. Based on the lesson learned and experience gained from implementing previous CPF, the technical cooperation activities in this CPF will Focus on Food & Agriculture, Human Health, Water Resource Management, Nuclear Safety, Radio Active waste Management, Nuclear Power Development, Industrial Application, Climate Change and Environmental Protection, Nuclear Safety Physical Protection and Safe Guard.



Group photo after signing CPF ceremony

Side Event of IAEA GC and Exhibition



Pakistani experts delivering lectures in IAEA Exhibition side event

A side event was also held on 18th September, 2019 during IAEA GC & Exhibition. This side event was held to highlight the contributions & efforts made by Pakistan to achieve sustainable goals (SDG) in the country.

The event was inaugurated by Chairman PAEC and attended by a number of IAEA officials, Diplomats, Foreigner delegation, Pakistani officials working in VIC & UN office. Pakistani Ambassador to Austria Mr. Mansoor Ahmad Khan and Minister Technical Mr. Aamir Manzoor also spoke on occasion. Four expert from Pakistan briefed the audience about the contribution made in health, Agriculture, Safety & Security, Power, HRD and R&D sectors.

Member PNRA Mr. Faizan Mansoor spoke about the safety & security of Nuclear Power plant and Radio active materials in the country.

Dr. Zain Khurshid in her presentation described uses of nuclear technology in Nuclear Medicine & Oncology in Pakistan. She told the audience that 18 cancer hospitals established by Pakistan Atomic Energy Commission are providing the diagnostic and therapeutic facilities to the cancer patient in the country. Spread all over the country these hospitals are equipped with most-advanced & developed techniques.

Dr. Nayyar Iqbal told the audience that four research centres in Agriculture & Bio-technology are actively engaged in development of different crop varieties of light yield and more resistance to diseases. In order to achieve food security and zero hunger in the country, till date 111 new varieties of different crops have been introduced to the farmers. He told the audience that Nuclear & Bio-technology are being used for converting saline land into cultivated fields.

In the end, Dr. Imtiaz Ahmed, National Liaison Officer Pakistan, briefed about all other sectors where nuclear technique are being used for the socio-economic development of the country. He told the audience that five Nuclear Power Plants are in operation in the country and Two 1100 MW are under construction. Similarly PAEC has established quality HRD Centres to train Manpower for future of PAEC. Pakistan Institute of Engineering & Applied Sciences (PIEAS) is one of the leading Engineering University of the country. In the area of Research & Development in nuclear and allied fields, Pakistan Institute of Nuclear Science & Technology (PINSTECH) is playing pivotal role as premier R&D institute in the country. In the area of Non-Destructive testing, National Centre for Non-Destructive Testing (NCNDT) is contributing to the national industries.