

PakAtom

Newsletter of the Pakistan Atomic Energy Commission

July-August, 2014

39th International Nathiagali Summer College Inaugurated By Mr. Mamnoon Hussain President of Pakistan



President of Pakistan Mr. Mamnoon Hussain inaugurated the 39th Summer College on 4th August 2014.

Left to Right Dr. Dr. Hafeez Hoorani, Scientific Secretary INSC, Dr. Ansar Parvez, Chairman PAEC,

Mr. Mamnoon Hussain President of Pakistan, Dr. S. M Javed Akhtar Member (Science), Dr. Syed Javaid Khurshid Executive Secretary INSC.

The 39th college inaugurated on 4th August 2014. In his inaugural address, President of Pakistan said that only through the acquisition and application of Science and Technology, a nation can set itself on the path of real progress, allowing its people to fulfill their dreams.

He mentioned the ability of PAEC to hold the Nathiagali Summer College activity without any break for the last 39 years. He emphasized that Pakistan is fortunate to have been richly endowed with bright and young people who will one day be leading this nation.

It is our job to educate them, to introduce them to the challenges of Science and Technology and to provide them an opportunity to grow and to become useful and productive citizens of a modern Pakistan. He extended full support of Government to PAEC for holding this extremely useful scientific activity of Summer College in the country and thus providing opportunity to the scientific community.

He reaffirmed the unconditional and full support of Government of Pakistan to PAEC for pursuing Civil Nuclear Power Program to achieve target of 8800 MW before 2030 and to fulfill the vision of 42000 MW before 2047.

Earlier in his welcome address Dr. Ansar Parvez, chairman PAEC paid tribute to the late Director INSC Dr Riazuddin and emphasized on the valuable role played by INSC to discuss recent trends in physics.

He mentioned that PAEC take pride that it has sustained this Scientific activity over the years. He also mentioned the continues support of government and ASICTP to this college for last 39 years. He highlighted the growing relationship of PAEC with the world renowned centers of CERN and SESAME.

He mentioned that PAEC applied to become associate member of CERN and a CERN Task Force visited Pakistan early this year to evaluate Pakistan's candidacy. The Task Force gave a strong "yes" to Pakistan. That was an achievement of the Government commitment to Science and Technology.

He mentioned the commitment and mandate of PAEC to develop nuclear technology for security and prosperity of the country. He highlighted the short term and long term goals of PAEC Nuclear Power Generation to achieve 8800 MW before 2030 and to establish new Nuclear Power Plants to contribute to the goal of 42000 MW before 2047. He also



Chairman PAEC Dr. Ansar Parvez presenting the Shield of 39th INSC to President of Pakistan Mr. Mamnoon Hussain

mentioned achievement of PAEC in health sector, industry, agriculture and manpower development which is essential to support the new and upcoming programs of PAEC. In

the last he especially thanked the international community of scientists for their cooperation to share their knowledge for making the college successful.

NIFA organizes Workshop on IPM Approaches for Insect pests of Agricultural Importance

Nuclear Institute of Food & Agriculture (NIFA) Peshawar organized One Day Workshop on "IPM Approaches for Insect Pests of Agricultural Importance" in collaboration with the Provincial Department of Agriculture Extension at Farm Services Centre, District Swabi, KPK, 3rd September 2014.

The workshop was attended by 45 Plant Protection Officers, Agriculture Officers and Field Assistants from Swabi, Bunir and Haripur districts.

Experts from Entomology Division including Mr. Alam Zeb, Head ED, Mr. Amanullah Khan, DCS and Dr. Inamullah Khan, PS delivered lectures on the integrated management of fruit flies/termite, honey bee keeping and control of mosquitoes, respectively. Each lecture was followed by a series of question answers session.

All the trainees took keen interest in these specialized lectures.

Dr. Ihsanullah, Director NIFA was the chief guest in the concluding session. In his concluding remarks, he highlighted R & D activities and achievements of PAEC in general and NIFA in particular.

He urged the participants to keep close contact with NIFA scientists in future to develop coordination for the promotion of environment safe IPM approach to control insect pests of national importance.

Director NIFA pointed out that extension department acts as a bridge between the research communities and the end users and emphasized that such workshops not only play a key role in sharing knowledge and expertise but also initiate valuable collaboration between different organizations.

Earlier, the training was inaugurated by Mr. Hasan Taj, District Director (Agriculture), Swabi. In his welcome address, he mentioned that the package of developed IPM technology for fruit flies and termites by NIFA are proving effective for insect control in the province.

He appreciated linkages between NIFA entomologists and extension departments for an efficient transfer of Technology to the farming community.

In his introductory remarks, the course organizer, Mr. Amanullah Khan, said that such forum provided an opportunity for the participants to learn modern technologies for dissemination to the end users in order to

create awareness and protect the crops from devastating insect pests.

At the end, Director NIFA distributed various technical pamphlets on the R&D activities of Entomology Division

among the participants while District Director Agriculture, Swabi thanked scientists of PAEC for their cooperation and appreciated the efforts for arranging such valuable training workshop.



Director NIFA addressing to the participants of the workshop at concluding session.

Bannu Institute of Nuclear Medicine Oncology and Radiotherapy (BINOR) is Fully Functional

Bannu institute of nuclear medicine oncology and radiotherapy (BINOR) is a state of the art 60 bedded hospital working under the parasol of Pakistan atomic energy commission with a mission to serve humanity. Binor is rendering its professional services to the patient from Hangu, Kohat, Karak, Bannu, Lucky Marwat, North & South Waziristan and Mianwali.

OPD, Day cares, Radiotherapy, Oncology and Nuclear medicine departments are fully functional and are equipped with the latest machinery. Professionals at BINOR, are striving to render quality services to serve humanity.

BINOR, with the cooperation of Tanzeem Lissail wal Mehroom, is providing free cancer medicine to the poor patients who are unable to bear the expenses.

Oncology department is fully functional where chemotherapy and radiotherapy services are being provided to the patients by a team of well trained professionals.

Medical physics department at BINOR is equipped with conventional simulator and cobalt 60 Teletherapy Unit



Visit of chairman zakat & MS DHQ



Dose delivery at CO-60

where patients receive the best possible treatment by the team of professional physicist and technicians. Quality assurance of the equipment and radiation protection is the uttermost policy of medical physics department by following the international guidelines and procedures.

Nuclear medicine department at BINOR is functional since 2013. Various test and scans like Bone scan, thyroid scan, DTPA Scan (Renal scan), DMSA, and Hida are performed on latest dual head gamma camera.

Pathology Lab at BINOR is fully functional and equipped with Selectra Junior (Bio chemistry analyzer), Quintus (Hematology analyzer), Elisa, Gamma Counter, LFTs, RFTs, Lipid Profile, LDH, Glucose, calcium, ESR, CBC, HBSag, TSH, FT4, TT3 test are being performed in Pathology Lab.

Radiology department is providing state of the art services to the patients on latest machines e.g. Digital X-Ray Machine, mammography, and ultrasound services.

Dr. Mehboob-ur-Rehman (Pride of Performance) wins ICAC “Cotton Researcher of the Year Award for 2014”

It is a matter of great pleasure to share this news that the International Cotton Advisory Committee (ICAC, Washington DC) has announced Dr. Mehboob-ur-Rehman (Principal Scientist, NIBGE) as winner of the most prestigious international cotton award “Cotton Researcher of the Year 2014”. This is highly competitive as cotton researchers from all Members States (almost all cotton growing countries of the world) compete for this award. Dr. Mehboob-ur-Rehman has specialized in plant genomics and molecular breeding. He has been instrumental in establishing seed center at NIBGE, bred Bt-cotton varieties (IR-NIBGE-901, IR-NIBGE-3701 etc.) developed useful cotton genetic material, generated extensive biosafety data for the safe use of Bt-cotton in Pakistan, etc.

In total seven cotton varieties have been approved by the Govt. of Pakistan for cultivating in Punjab and Sindh provinces. He has also completed more than 10 national and international projects funded by various national and international agencies, and recently three mega projects

are going on in his lab. He remained one of the active partners in the physical mapping of D-genome sequencing project, and in sorghum genome sequencing project. Dr. Rehman has published 57 peer-reviewed research articles



Dr. Mehboob-ur-Rehman

including two in 'Nature' as co-author, an also published eight chapters in books published by Springer. Dr. Rehman has also delivered multiple talks in national and international conferences. The ICAC will honor him with a certificate of recognition, a shield and an honorarium in the 73rd plenary meeting to be held in Greece.

Intensity Modulated Radiotherapy at INMOL

INMOL has become the first PAEC cancer hospital to start intensity modulated radiation therapy (IMRT). IMRT is the best technique to deliver escalated dose to tumor while reducing dose to surrounding normal structures.

It also enables to modify isodoses in irregular shapes. The radiation dose escalation makes better tumor control possible. Normal tissue sparing helps in reducing the radiation induced side effects. The IMRT treatment delivery is based on inverse planning system, linear accelerator and

multileaf collimator. A stringent quality assurance procedure is performed to ensure the accuracy of gantry, MLC and table motions. The radiation beam output, percentage depth dose and profiles are also more precisely measured.

The major steps in establishing IMRT are dosimetry of LINAC, commissioning of inverse planning system, creation of verification phantom and acceptance testing of inverse planning system.



IMRT Team with Director INMOL Dr. Abubakar Shahid

NCNDT, NEW-1 Non-Destructive in-service Inspection (ISI) Services for CNPGS

The National Centre for Non-destructive Testing (NCNDT) of Nuclear Equipment Workshop-1(NEW-1) recently carried out non-destructive in-service inspection (ISI) in nuclear island of CNPGS unit # 1 during refueling outage (RFO-9) and of unit # 2 during RFO-2. The NDT techniques applied were Ultrasonic Testing (UT), Liquid Penetrant Testing (PT), Hardness and Metallographic Testing. In every scheduled of refueling outage, different components and pipelines of the plants are subjected to ISI for assurance of their integrity. NCNDT has got expertise in ISI of class 1 & 2 components and piping systems and have saved a lot of foreign exchange.

During RFO-9 of CNPGS unit # 1 and RFO-2 of CNPGS unit # 2, safety class 1 & 2 components and piping systems in nuclear island were inspected with increased work scope as compared with previous RFO,s. The components include steam generator and pressurizer welds and inner radius section of nozzles. Welds of residual heat removal system (SRH), safety injection system (SIS), main feed water system (SMF), chemical & volume control system (SCV) and reactor coolant system (SRC) were also inspected. NCNDT also provides supervisory services in Eddy Current Testing (ET) of tubes in main steam turbine condensers and lube oil cooler.

At present, NCNDT is also in a process of signing a contract with China Nuclear Power Operation Technology Corporation Limited (CNPO) for participation in the Pre-Service Inspection (PSI) of Chashma Nuclear Power Plant unit # 03, which will be further extended to Chashma Nuclear Power Plant unit # 04. To meet these additional requirements, NCNDT is in a process of up-grading its capacity in terms of equipment and manpower.



Ultrasonic Weld Inspection of Safety Injection System of CNPGS Unit # 1

NIFA Organizes Training Course for Pak Army Officers

Nuclear Institute for Food and Agriculture (NIFA), an R&D establishment of PAEC at Peshawar has long technical cooperation with Army Service Corps (ASC) School, Nowshera and providing regular technical services to strengthen the food value chain of the Pak Army.

As sequel of this collaboration, a one day training course on “Food Science” was organized by Nuclear Institute for Food and Agriculture (NIFA), Peshawar for Pak Army Officers from different centers of Army Service Corps (ASC) on

August 18, 2014. The course was attended by 22 Army Officers of Captain Cadres from all over the country.

The course was aimed at familiarizing the participants with theory, analysis, quality control and nutritional value of food items.

The course was formally inaugurated by Director NIFA, who in his speech highlighted the achievements of the institute, significance of food processing and other research activities related to food harvest losses.

Earlier, Mr. Misal Khan, Principal Scientist/course organizer welcomed the participants and elaborated the objectives of the course.

The course consisted of four lectures delivered by Dr. Ihsanullah, Director (Food Safety & Security), Mr. Fazal Mahmood, Head Food Science Division (Food Irradiation), Dr. Aurang Zeb, DCS (Significance of Nutrition) and Dr. Taufiq Ahmad, DCS (Importance of Oil/Fats) followed by visit of exhibition lobby and practical demonstration conducted by food scientists.

At the concluding session the participants expressed their views and highly appreciated the role of NIFA in providing quality training facilities and creating awareness regarding food preservation and other advanced techniques.



A group photo of participants of Training Course with Director NIFA and faculty members

NIFA Launches National Project on Stability Studies of Iodized Salt in Pakistan

For achieving better health standards, Nuclear Institute for Food & Agriculture (NIFA) Peshawar is contributing towards national level programs in the discipline of nutrition. Having technical expertise, the Nutrition Group of Food Science Division has recently been awarded grant to run a competitive project on “Stability of Iodine in Iodized Salt in Different Packing Materials under Different Climatic Conditions” at NIFA.

This project was launched with completion of the preparation of iodized salt samples at Hub-Pak Salt refinery, Hub on July 24, 2014.

The project PI, Dr. Aurang Zeb, DCS along with the project team visited Karachi and Hub in July 2014 during which different salt types were prepared at Hub. After proper

iodization and packing in different packing materials, the salt samples were placed and stored at Karachi, Nawab Shah, Faisalabad and Swat, representing the 4 climatic zones of Pakistan.

Hygro-thermometers/data loggers were installed at the storage sites for recording data on ambient temperature and RH% for the whole storage period of one year. Samples will be retrieved at quarterly intervals for analysis; while 0-day samples were taken at the time of preparation.

Director NIFA, Dr. Ihsanullah thanked and acknowledged the extended cooperation of the Directors of AEMC Karachi, NORIN Nawab Shah, NIAB Faisalabad and SINOR Saidu-Swat for providing storage space for the experimental samples and deputing technical officials.

DNPER Develops Advanced Reactor Core Surveillance and Ageing Management Systems for 300 MW & 1000 MW Nuclear Power Plants

The Directorate of Nuclear Power Engineering - Reactor (DNPER) has designed and developed advanced systems of in-situ reactor core surveillance and ageing management in NPPs with the objective of enhancing safety and availability of nuclear power plants. Some of these systems have been installed at C-1, C-2, whereas for C-3 & C-4, their development is completed:

- ★ Reactor Internals Vibration Monitoring System
- ★ Loose Parts Monitoring System (LPMS)
- ★ Thermal Fatigue Monitoring System (TFMS)
- ★ On-line Machine Condition Monitoring System
- ★ Portable Dual-Channel Vibration Analyzer

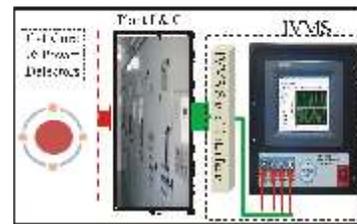
The Reactor Internals Vibration Monitoring System (IVMS) monitors in-situ displacement and frequencies of core barrel motion due to interaction of high-pressure coolant flow, and computes dynamic stresses on core support structure. This system is an essential requirement of two international standards (ASME-OM-05 and RG-1.20). All modern PWRs are equipped with this system. The DNPER-designed IVMS was installed at C-1 and has been qualified by the Reactor Designer. The IVMS for C-2 is ready for delivery.

LPMS is an essential device for monitoring NSSS integrity in PWR plants to protect against damage caused by foreign objects trapped in reactor pressure boundary. The specialized software of DNPER-designed LPMS can detect and locate loose parts in coolant system and estimate their mass /energy. The indigenous LPMS has been qualified by PNRA and was installed at C-1 for one RFO.

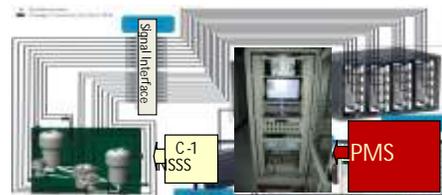
The TFMS has been developed for CNPGS to meet the regulatory requirement from PNRA. The system measures cyclic thermal stratification at key locations on the primary coolant piping. The system is working at C-2, and for C-3/C-4 plants, the development is complete.

DNPER's-designed On-line Machine Condition Monitoring System has been developed for Industrial Plants and NPPs. It provides automated machine fault diagnostics to assist in optimization the operation of key production assets. DNPER has already supplied this system to several PAEC projects.

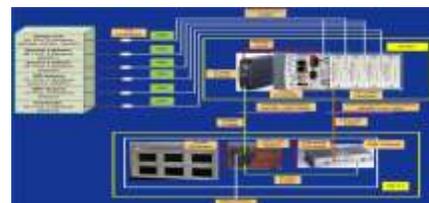
Functioning of DNPER-Developed Reactor Surveillance and Ageing Management Systems



REACTOR INTERNALS VIBRATION MONITORING



LOOSE PARTS MONITORING SYSTEM



THERMAL FATIGUE MONITORING SYSTEM

10th Senior Officers Management Course concludes at PIEAS

The 10th Senior Officers Management Course (SOMC-10) concluded at Pakistan Institute of Engineering and Applied Sciences on 27 June 2014. Chairman PAEC, Dr. Ansar Parvez, was the chief guest at the graduation ceremony. Forty seven participants drawn from various strategic commissions i.e. NESCOM, PAEC, KRL, SUPARCO and PNRA received the certificates on the event.

Speaking on the occasion, Chairman PAEC appreciated PIEAS for its efforts in successfully organizing these courses. He said that the task of training the senior officers in management skills was assigned to PIEAS by SPD keeping in view its well established teaching standards and it is a pleasure to note that it responded to it by effectively consolidating the curriculum and contents of these courses and conducted the same at par with best institutions.

Congratulating the graduating officers, he advised them that while they may take home as many best practices as possible and apply them to achieve the objectives of their respective assignments and organizations, they should get rid of at least one of their bad habits / practices and adopt a good one.

Dr. Inam-ur-Rahman, Scientist Emeritus and Founder PIEAS, was invited as a special guest. He said that the forum of SOMC has made its mark in quality and contents despite meager resources available to it. To ensure yet better performance and continuity, he proposed that it should have its own dedicated building equipped with all necessary facilities. He reminded that he had earlier made the same appeal to Mr. M. Irfan Burney, Chairman NESCOM

and Major General (Retd.) Ahmed Bilal, Chairman SUPARCO at this forum and they had promised their full support. Responding to the proposal by Dr. Inam-ur-Rahman, Chairman PAEC advised PIEAS authorities that a formal proposal on the subject may be sent to him so that he may solicit necessary support from stakeholders and SPD.

In his welcome address, Dr. Muhammad Aslam, Rector PIEAS, narrated the developmental stages of SOMC and thanked Chairman PAEC and SPD for their support in its progression. He also highlighted that contents of these courses have been designed to promote innovation and productivity of the workplace coupled with quality and cost consciousness in work assignments related to socio-economic development of the country.

Earlier, Dr. Jamil Ahmed, Course Director presented the summary of the proceedings of this twelve-week discourse. He informed that apart from this Senior Officers Management Courses, PIEAS is also running a series of Middle Management Courses for the officers of strategic commissions, and put together, it had trained more than two thousands officers during last few years.

Besides SPD, a high level of patronage is being provided to this training activity by strategic commissions whose chairmen, members and high level officials remain associated with these courses. Eminent personalities from Ministry of Foreign Affairs, ACDA, SPD, Strategic Commissions and Civil Society are also invited to deliver lectures.



A Group Photo of PAEC officials with Chairman PAEC, Rector PIEAS and Dr. Inam-ur-Rahman

NIBGE Scientists Awarded 3 Research Grants from International Foundation of Science (IFS) in 2014

Three Scientists of NIBGE are awarded with the research grants of 12,000 USD from International Foundation of Science, Sweden, in the area of water resource management. Dr. Muhammad Afzal, Principal Scientist from Environmental Biotechnology Division won the grant of the project entitled; *A plant-bacterial synergistic strategy to improve degradation of synthetic textile dyes in constructed*

wetlands. Dr. Ayesha Ihsan, Senior Scientist from Industrial Biotechnology Division won the grant on the project entitled; *Development of fluorescence turn off sensor for heavy metals detection.* Dr. Asma Rehman won the grant on the project entitled; *Synthesis of macro-porous material for metal removal from water/wastewater.*

Certificate Distribution Ceremony of Belgatom Training Program Conducted by DNPEP



Group photo of the resource person with Chairman PAEC, Dr. Ansar Parvez and others

Directorate of Nuclear Power Engineering-Plants (DNPEP) organized a comprehensive professional development program to improve the knowledge and skills of NPE engineers and scientists, regarding the PWR design. The training program was based on step-1 Belgatom training material. 60 officers of NPE participated and qualified the course. 25 course experts having extensive experience in their respective areas delivered lectures during the training program. Training was organized in two batches of about 8 months duration which started in November 2012 and ended in April 2014.

Certificate distribution ceremony was held on August 08, 2014 at Chairman Secretariat auditorium. Chief Guest Dr. Ansar Pervez, Chairman PAEC, graced the occasion with his presence and awarded certificates to the course participants of the training program. Later, the Chairman addressed the house.

Addressing the house the Chairman congratulated the qualifying officers and lauded the initiative of DNPEP to conduct this training program. He said that this training will

really be useful for the capacity building of the organization. He further added, that similar training program should also be conducted in other PAEC establishments to bring harmonization among design organizations.

Member Engineering, Mr. Saleem A. Ansari in his speech, stressed the importance of training and retraining of designers to improve the availability and safety of Nuclear Power Plants. Director DNPEP, Mr. Jamal A. Nasir highlighted the course benefits and said, that this training program has provided a real opportunity to develop a team of NPE engineers/scientists, who are now fully capable to take part in the design and engineering of NPPs, to render technical support to operating power plants and to play a vital role in the development of Indigenous Nuclear Power Plants.

Course coordinator, Mr. Waseem Uddin Farooqi in his address, thanked all the directors and managers of NPE, the resource persons and the participants for their valuable support and cooperation which made this training program a real success.



Group photo of the participants with Chairman PAEC, Dr. Ansar Parvez and other officials