Pakistan's nuclear facilities are safe and secure.

Pakistan has a proven nuclear safety track record as verified by world nuclear bodies like International Atomic Energy Agency (IAEA) and World Association of Nuclear Operators (WANO). This was stated by Chairman, PAEC, Parvez Butt, while inaugurating a three-day workshop jointly organized by Pakistan Nuclear Regulatory Authority (PNRA) and IAEA on "Safety Standards for Design of Nuclear Power Plants", at Islamabad from 3-6 February, 2003.

For attaining safe nuclear operations, PAEC has been at the forefront for promoting the establishment of an independent nuclear regulatory authority and after coming into existence of PNRA, PAEC establishments now fully comply with the guidelines provided by it. Similar guideline functions were being performed previously by Directorate of Nuclear Safety and Radiation Protection, PAEC also works in close collaboration with IAEA and WANO for establishing safe operational practices and procedures. These world bodies, during the entire course of our nuclear power operations, have endorsed the safety of our plants through peer reviews and other professional evaluations.

Chairman PAEC opined that after the Chernobyl accident, the safety regime and culture in nuclear operations was made enormously robust, vigilant and reliable. Thanks to these efforts, no nuclear accident occurred after that.

Appreciating the significance of the Workshop, Mr. Butt said, a sound design is the foundation of a safe nuclear power plant. Deploring the denial of detailed nuclear plant experience possessed by the advanced countries to the developing countries, he said this know-how is being shared only in the area of safety. He paid tributes to IAEA for consolidating foolproof operational and safety standards for nuclear plants.

For being self sufficient in nuclear plant operations, PAEC has set up its own training institutes like Pakistan Institute of Engineering and Applied Sciences (PIEAS), Karachi Institute of Nuclear Power Engineering (KINPOE) and CHASCENT at Chashma, which are providing trained manpower for our operations.

Nuclear power, apart from being safe, clean and cost effective, is needed by Pakistan for providing stability to the national grid during winter seasons when the hydel production is reduced due to low availability of water in the rivers. Based upon its own technical resources and 30 years of operational experience, PAEC, in consultation with IAEA and PNRA, is working for the extension by 12-15 years in the design life of KANUPP. This trend is in vogue in other countries also as the extension in life provides cheaper bonus energy not taken into consideration in earlier feasibility studies.
Mr. M. Gasparini, from the Safety Division of IAEA, said that this is the first workshop on safety standards and several will follow Guidelines and practices on safety, prepared by IAEA, have been endorsed by all member states. New plants will not be incensed until the latest guidelines are incorporated, he added.

Mr. Jamshed Azim Hashmi, Chairman, Pakistan Nuclear Regulatory Authority commended the initiative of PAEC, the largest stake holder in nuclear facilities in Pakistan, for putting in efforts to evolve better safety practices and culture. A series of national workshops are planned under IAEA TC Project on “Strengthening of Nuclear Regulatory Authority in Pakistan”. This is the first workshop of this series on Safety Standards for Design of NPPs. Evolving a common understanding vis-à-vis licensee about the current international safety standards being used in the design of NPPs is essential and in addition to imparting knowledge, these workshops will foster a culture of exchange of technical know-how and information among the PNRA and the licensees.

**CHASNUPP connected back to grid after first refueling outage**

Ignoring a temporary grid connection for the Turbine Overspeed Test, CHASNUPP was connected back to the Grid at 12:09 hrs. on 18 January 2003, signifying the formal end of the refueling outage (RFO) # 1', over a period of 110 days 2 hrs. and 15 minutes after disconnection from the Grid.

The scope of work in this outage was quite extensive. Besides the main objective of refueling the reactor, many major equipment were overhauled and maintenance-inspected including the RCP-A Motor and the Main Transformer. Sludge balancing of the Steam Generators was carried out. The Turbine Generator was overhauled and inspected. The Integrated leak Rate Test and Structural Integrity Test of the Containment Building were performed at 15% above design pressure.

The plant organization has gained a lot of experience and valuable information about detailed planning and preparation, reporting of abnormalities, control of modifications, co-ordination between various work units, post-maintenance testing, etc. This know-how will certainly be of great advantage for more efficient outage management in the future. It is a matter of satisfaction that the total radiation dose to workers remained less than 35% of the target of 800 mSv, and there was no significant industrial safety event.

**Atomic energy playing significant role in boosting up agriculture production**

Application of nuclear energy in agriculture can play a vital role in boosting up agricultural production, thereby leading to poverty alleviation and socio-economic development. This was stated by Pakistan Agricultural Research Council (PARC) Chairman, Dr. Badaruddin Soomro during his visit to Nuclear Institute for Food and Agriculture (NIFA), Peshawar, on 24 January, 2003.

Referring to the steps taken by the researchers of different organizations including PAEC agriculture centers, he said harnessing agriculture frontiers on scientific lines was a key to success. The goal oriented research is the need of the day and PARC would be very much pleased to support applied research in the country. The future of Pakistan depended on the success of science and technology on sound footings. All our efforts especially in agriculture research need to be focused towards economic growth. Without developing a sound indigenous base for science and technology, we can neither prosper nor live in peace and security. He acknowledged the achievements made by NIFA scientists and their contributions particularly in evolving new cash crop varieties of wheat, chickpea and canola to increase the agricultural productivity in NWFP. By organizing different training courses regularly, NIFA is undoubtedly contributing significantly in providing a cadre of trained manpower.
Dr. Badaruddin Soomro said that Government was giving top priority to the agriculture sector for economic uplift. He said due to the dedicated efforts of the scientists, Pakistan has started exporting wheat and progressively making its way into the international market. He said if Pakistan wanted to compete in the export market then we would have to follow the WTO standards. Dr Soomro highlighted the PARC’s contribution towards National Agricultural Research System Development, and strengthening research, education and extension linkage. He said the Government had allowed the PARC to establish an agricultural research endowment fund. PARC has already provided two national interest ALP projects to NIFA. Five more projects are approved in the field of entomology, saline agriculture and crop mutation breeding. Presently PARC in collaboration with PAEC is executing a project on Saline Agriculture Development in Pakistan.

Director NIFA, Dr. M. Jamil Qureshi, highlighted the achievements made by NIFA in the field of food and agriculture and the efforts made in human resource development for sustainable agriculture productivity. He said about 70 percent people in the country are directly linked with agriculture and the development in this field would improve the socioeconomic conditions of the people. The success of an agricultural project depends on how it can modify the old methods of farming. NIFA has developed eight high-yielding, widely adapted and disease-resistant crop varieties of wheat, chickpea and brassica. NIFA has also done a remarkable job in preservation of food commodities by nuclear and other advanced techniques. An economical and efficient solar dryer has been developed for the farming community and also standardized methods of shelf life extension of fresh fruits. NIFA is also engaged in research on integrated pest management in order to reduce losses and promote environment-friendly technologies, and collaborating in a national project on iron fortification of wheat flour. NIFA has provided training to more than 500 participants in different courses.

**KANUPP reactivates by June 2003**

**Work on Plant Life Extension in full swing**

The Karachi Nuclear Power Plant (KANUPP) will be brought back in operation by the middle of 2003, when it will start providing 80-100 MWe electricity to the grid.

KANUPP started commercial operation in 1972 and completed its designed life of 30 years on December 5, 2002. In spite of many challenges and restrictions imposed by the supplier countries, the plant was kept operating safely by embarking on a well-planned programme initiated by the PAEC, based on self reliance, to overcome the problems due to lack of vendor's support.

During the first 15 years of plant life, attention focused mainly on keeping the plant operational by producing the nuclear fuel indigenously and by maintaining the plant system and equipment through development of the needed know-how and a capability to produce spares. This made the continued operation of the plant possible without any vendor support. On the basis of operation and maintenance experience, PAEC initiated various projects to combat aging problems and for safety upgrades of the plant during its design life and to judge if it could be operated safely beyond its design life. The Effective Full Power Years (EFPY) by end 2002 amount to only 10.8 due to the fact that plant has mostly operated at reduced power owing to international embargoes by the vendor countries. This fact, together with good health of critical components of reactor systems as revealed by various periodic inspection program, enabled PAEC to go for Plant Life Extension (PLEX) of KANUPP through implementation of different development projects including Technological Upgradation Project (TUP), Safe Operation of KANUPP (SOK) and Balancing, Modernization & Rehabilitation (BMR) projects. The major areas of improvement covered under TUP are the replacement of obsolete Computers, Control and Instrumentation (CC&I). The SOK project, envisages enhancement in plant safety as far as
possible in line with current international standards and practices through: Inspection/review of critical components such as Fuel Channel, Steam Generator, Fueling Machine; Improvement in Operational Safety through Aging Management, Equipment Qualification, Surveillance, Physical Protection, Operators Training, etc.; Design reviews and modifications e.g. Revision of Final Safety Analysis Report (FSAR), PSA Level-1 completion and modification in safety systems such as Emergency Core Cooling, Emergency Feed Water, Essential Power, Seismic Re-assessment and retrofitting.

The BMR project catered for replacement of obsolete and aged electrical and mechanical equipment of conventional side.


The reactor was shut down on the completion of its 30 years' life to meet the re-licensing requirement of the PNRA. On the day it was shut down the plant had achieved an availability factor of 80 per cent during the calendar year. During this re-licensing outage, many design changes, improvements and safety upgrades are being implemented to bring the plant closer to the current safety standards while some aging and obsolete system will also be replaced or refurbished.

In the wake of on going improvements and safety upgrades, KANUPP is expected to, continue to operate safely and efficiently for 10 to 15 years beyond its designed life, in line with current international standards, after re-licensing by PNRA.

The work on Plant Life Extension (PLEX) of KANUPP, being undertaken mostly with local efforts, would not only help in meeting electricity short fall to the metropolitan city of Karachi but would also establish another landmark to self reliance and indigenisation program of PAEC.

Testing of Reactor Power Regulation Function

The reactivity control systems at KANUPP are divided into two groups based on operating speed. The fast acting systems include moderator level control which is the primary method of reactivity control and reactor power regulation for KANUPP.

The safety record of KANUPP during 30 years operation remained excellent as was endorsed by several review missions like IAEA-OSART in 1985 and 1989, IAEA-ASSET in 1989, WANO Peer review in 1994, 1996 and 2000. During this re-licensing outage, many design changes, improvements and safety upgrades are being implemented to bring the plant closer to the current safety standards while some aging and obsolete system will also be replaced or refurbished. In the wake of on-going improvements and safety upgrades, KANUPP is expected to continue to operate safely and efficiently for 10 to 15 years beyond its designed life, in line with current international standards, after re-licensing by PNRA.
The Plant was originally designed using centralized Direct Digital Control Computers to control the reactivity and the neutron power of reactor to match the turbine demand and maintain a constant steam pressure during power generation.

Due to phenomenal developments in the field of electronics and computers, these computers became obsolete very early in the plant life. An in-house facility was developed to keep the plant computers operational. However, it soon turned out that the solution lay in their replacement with modern Programmable Logic Controllers (PLCs) providing distributed approach as against the existing philosophy of large computer performing multiple functions including regulation, annunciation, monitoring, logging and computations.

The task of replacement was entrusted to engineers working for TUP (Technological Upgradation Project). Only the essential equipment was purchased from abroad while all the engineering has been done by KANUPP including application software development. This resulted in saving millions of dollars in foreign exchange and the development of in-house design and development capabilities.

KANUPP is probably the only nuclear power plant to have undertaken such large scale replacement of computers, control and instrumentation without vendor support. The comprehensive off-line testing was in progress for the last 2 to 3 years. Keeping in view the complex nature of work associated with the replacement of existing regulating computers, it was decided to test the performance of new system by performing reactor power regulation function in place of one of the existing computer ARC. The second computer BRC remained available with full functionality during this testing. Reactor was made critical and Plant was synchronized with the grid and operated for 21 days using this new System. Final on-line "load rejection test" was successfully carried out on December 4, 2002. This test was witnessed by senior personnel from PAEC and PNRA.

Now that the on-line testing is complete, both plant controlling computers will be replaced in the present shutdown. The experience and confidence gained through the successful designing and commissioning of the new regulating system will go a long way in completing other projects related with plant life extension.

KANUPP Probabilistic Safety Assessment (PSA) Level 1

Safe Operation of KANUPP has always been a priority. To this end, a number of expert missions from IAEA have been invited by PAEC. As a result of such a mission, it was felt that a Probabilistic Safety Assessment Level 1 (PSA-1) for KANUPP should be undertaken. This involves development of detailed system models (fault trees) and accident sequences (event trees) for the plant. In addition, extensive human reliability analysis (HRA) is required to be done. Since KANUPP has a long operating history, it was decided to use a plant specific component failure database. Bayesian statistical methods were used to update priors, obtained from generic data, to get posterior distributions. The maintenance and initiating event frequency database was also developed from plant specific information.

Risk Spectrum, a Swedish PSA software, was used for analysis. The objectives of the PSA included: better understanding of the plant and interactions between systems, uncovering design weaknesses and suggesting possible improvements, evaluation of allowed outage times (AOTs) for critical components, optimization of surveillance test interval (STIs), and, operator training.

IAEA experts visited KANUPP at various milestones to review the work and suggest improvements, if any. This was an important factor in maintaining the high quality of the study. After completion of the study a pre-IPSART and then a full scope IPSART mission of the IAEA took place to evaluate the technical quality of the PSA. Their conclusion was that the study was of a high technical quality and very
professional. The IAEA expert during the study felt that this was mainly due to the dedication, sense of responsibility and feel of ownership displayed by the PSA team. As a result of this study, KANUPP, and thus PAEC, has developed considerable expertise in the areas of Data Analysis, Human Reliability Analysis, Fault Tree Development & Analysis, Event Tree Development & Analysis, PSA Results Interpretation, and PSA Application. The expertise developed at KANUPP PSA will also be utilized not only to ensure CHASNUPP PSA quality but also to transfer know how to the on site CHASNUPP PSA team. KANUPP operators gratefully acknowledge and appreciate the assistance provided by IAEA and the IAEA Experts.

The KANUPP PSA team is now involved in PSA Application covering Design Improvement, Allowed Outage Time (AOT) Evaluation, and Surveillance Test Interval (STI) Evaluation. First task of PSA Application i.e. Design Improvement has been completed. The AOT & STI evaluation has its own specific model requirement. The recommended design improvements are now being integrated into the model and some changes required for AOT & STI evaluation are being incorporated. It has been decided to conduct a detailed Fire PSA, expected to be completed in 2005.

**Indigenisation only way to attain prosperity and national security**

**PAEC Chairman calls for self-reliance in science and technology.**

Indigenous scientific solutions are the only path to attain prosperity and security for the nation as the borrowed knowledge under mechanisms of transfer of technology serve only limited purposes in limited areas, thereby making a recipient nation ever dependent on such dole outs. This was stated by Chairman, PAEC while inaugurating the three day, meeting on "Science & Technology -Capacity Building for Sustainable Development", organized by Commission on Science & Technology for Sustainable Development in the South (COMSATS), at Islamabad from 19-21 February, 2003.

There is no alternative to self acquired know how in solution of problems because only a comprehensive scientific base worked out by our own scientists and engineers can ensure the socio-economic uplift of the nation. Mindful of this reality, PAEC has always aimed to train its own human resource in diverse disciplines like applied research, agricultural development, informatics, nuclear technology, design systems and basic Industrial skills.

To ensure this target of self reliance in human resource, PAEC has set up multi-disciplinary educational institutes like PIEAS, CTC, KINPOE, CHASCENT, PWI and NCNDT. A well cultivated trained manpower emerging out of these centres has not only sustained PAEC's own high tech initiatives in various spheres of nation building but services of these scientists and engineers are also available for consultation and assistance to local industry.

Mr. Butt opined that Science & Technology in the country must be able to muster its own resources for the prosperity and security of the motherland. We should be capable of digging out from the earth what nature has bestowed for us and then grow and construct for our needs. These indigenous endeavors will bring about happiness, satisfaction and motivation for each citizen as these are the ingredients of sustainable development. Chairman, PAEC appreciated the due recognition to science and technology accorded by the government during the last 3-4 years which has resulted in substantial increase in the budget of S&T. Stressing indigenisation as the diving force, Mr. Butt recounted the services of PAEC rendered in the areas of minerals development, agriculture, health, nuclear energy and industrial development and defense of the country. Nuclear energy being clean, safe and economical is sustainable itself and also conducive and reliable for the long term economic planning.
Chairman PAEC was appreciative of the role of COMSATS which it is playing for the promotion of a culture of science and technology in the country and within its members.

Mr. Hameed Ahmed Khan, Executive Director, COMSATS, said that sustainable development includes not only less environmental degradation and less pollution but also reduction in several other ailments of society - poverty, illiteracy, disease, war, corruption and gender inequality. To develop an S&T base strong enough to support a nation's launch towards sustainable development, it requires building of new capacities and expansion of existing ones. Developing countries are constrained for the lack of necessary capacity to perform.

Dr. Khan enumerated the services of COMSATS in the areas of information technology, education, health, distance learning, internet services bio-technology, etc.

Appreciating the role of PAEC, Dr. Khan said that PAEC has played a central role in the capacity building not only in Pakistan but also in the developing world and it has great potential to achieve Pakistan's objectives of sustainable development. History "has proved that Pakistan has developed most of its capacity despite severe constraints and pressures."

**NEWS BRIEFS**

Messrs. Miroslav Lipar (Slovak) and Francisco Perramon (Spain) conducted an OSART Preparatory Meeting at CHASNUPP from 6-10 January, 2003.

Mr. Roland Geiger (Germany) carried out assignment at National Agriculture Research Centre (NARC), Islamabad from 11-16 January, 2003 to install equipment for the Workshop on the Surveillance of Rinderpest and to lecture on the Diagnosis of Rinderpest and PPR under Project - Setting up Immunonassay and Molecular Based Methods to Monitor and Survey Rinderpest Disease.

Messrs. Ovidiu Coman (Romania) and Marin J. Jordanov (Bulgaria) carried out assignment at KNPC from 20-31 January, 2003, for Review of Design of Delayed Neutron Activity Monitoring System under project - Improving Safety Features of KANUPP.

Mr. Ingemar Lund (Sweden) carried out assignment at PNRA, Islamabad from 27-31 January, 2003 to Assist Regulatory Authority for Revising National Mandatory to Implement ALARA Principle in Nuclear Power Plants under Project - Improving Occupational Radiation Protection in Nuclear Power Plants in Member States in the Asian Region. He also visited CHASNUPP on 30 January, 2003.

Mr. Franz Berkessy (Germany) carried out assignment at NCNDT, Islamabad from 28 January to 1st February, 2003 for Installation and Commissioning of Corrosion Monitoring System supplied under Project - Non-Destructive Evaluation of Pressurized Components and Concrete Testing.


The WANO-TC Workshop was attended by participants from Pakistan, Japan, Sweden, China and R.O.Korea.

**Indigenously designed and fabricated Mould Room Facility at CENAR**

Day to day replication and reproduction, and proper delivery of the prescribed dose to the target volume is hallmark of proper radiotherapy. Shielding of the vital organs in/or around target volume is of great importance. Modern radiotherapy department needs more and more complex planning to deliver designated dose to the tumor and spare normal tissue to the maximum. Proper execution of the dose is not possible without adequate arrangements. Various equipment are being used all over the world, including fixing and shielding devices. Mould room facility is an essential part of a good radiotherapy
department. The preparation of the shielding material is a complex job and a number of machines are used.

A mould room facility has recently been designed and fabricated locally at PAEC's Centre for Nuclear Medicine and Radiotherapy (CENAR), Quetta. Equipment like Styro Former, Electron cutter, Block Verifier, Alloymeter, Cooling Tray, Shielding trays, etc., was first tested on experimental basis and found of good quality. Now this is part of treatment planning set up and used to improve treatment quality and proper dose delivery system for the patients and reduce the undue exposure to the vital areas. The total expenditure for six items is approximately 2.5% of the cost of imported equipment, thereby effecting a saving of more than Rs. 3 million in foreign exchange. CENAR is now in a position to manufacture mould-room equipment and transfer this technology to other centres.

Recently Chairman PAEC Mr. Parvez Butt visited the centre and appreciated the efforts of CENAR and encouraged local fabrication of such equipment for other medical centres of PAEC.

Mr. Mohammad Hussain Sr. Technologist has designed and fabricated this equipment. He was trained on Mould-room Techniques in Australia, under IAEA programme.

**Quality Awareness Programme**

It is believed that this century will be the century of quality where the survival of organizations will primarily depend upon quality of items and services they provide and the economies of nations, to a large extent, will likewise depend upon the quality of export items they produce since this will directly affect their foreign exchange earnings. The generic principles of quality, quality control and quality assurance can be applied to bring about improvements in every field of application. These principles are also instrumental in enhancing the overall safety of nuclear facilities such as laboratories and commercially operating NPPs etc., when applied as per applicable criteria such as the relevant codes and standards.

The Directorate of Quality Assurance (DQA), has conceived a quality awareness programme to promote quality culture and to encourage organizations to adopt quality management systems and thus change the mindset so that quality is considered as a tool for better management. This programme, based on following two components, is structured to impart basic knowledge and core concepts of quality, quality control, quality assurance and quality management systems.

(i) Short seminars for middle management on: Total quality management - introduction to Dr. Deming's philosophy, Basic concepts of quality, quality assurance, quality control and inherent benefits of introducing quality management systems, Criteria for developing Quality Assurance Programmes for nuclear applications.

(ii) QA/QC Qualification/Certification Programme, with a comprehensive 2-3 weeks intensive QA Course, based on 6 modules: Basic concepts, Total quality management, QA Programmes and procedures, Elements of QA programmes for nuclear applications, Quality Planning and implementation, Methods of auditing and surveillance.

First seminar in this series was delivered by Mr. M. Azim, Director, DQA on "Total quality management - introduction to Dr. Deming's philosophy" on 15 January, 2003 at NCNDT which was attended by 59 participants from nine PAEC establishments. It is planned to hold more seminars at various establishments of PAEC.

**New Campus of Pakistan Welding Institute at Islamabad**

PAEC helping local industry in designing, welding and fabrication capabilities and quality testing techniques

Pakistan Atomic Energy Commission has undertaken numerous projects to impart training to local industry in basic industrial techniques. This was stated by PAEC Chairman Mr Parvez Butt at the opening
of construction of new campus of Pakistan Welding Institute at Scientific and Engineering Services (SES) Directorate, Islamabad.

As a part of its research and development programme, PAEC is undertaking various projects for imparting training to local industry in basic skills of designing, industrial welding techniques, fabrication capabilities and quality testing techniques. For the industrial development in the country, we must develop human resource, which is holder of basic skills to ensure sustainable growth of technology for maintaining a competitive edge in the emerging markets where value addition is technological driven, he said.

Talking about the genesis and necessity of the Pakistan Welding Institute, Mr. Butt explained that as welding forms necessary part of fabrication, therefore, the ultimate quality of goods depends upon deeper understanding of welding technology. That is why regular training in welding as a discipline of study is needed for the industry.

Discussing the stages of industrial development of the country, Mr. Parvez Butt said, the first stage of import of machines and plants is being replaced by indigenous production and that is where Pakistan Welding Institute would play a significant role. For this purpose, PAEC established Pakistan Welding Institute in 1995. PWI has so far provided training and certification to 725 participants coming from 110 premier national engineering companies and defense organizations. Besides, it has qualified about a hundred organizations in industrial welding procedures, he added.

For the industrial development in the country, we must develop human resource, which is holder of basic skills to ensure sustainable growth of technology for maintaining a competitive edge in the emerging markets where value addition is technological driven. As a part of its research and development programme, PAEC is undertaking various projects for imparting training to local industry in basic skills of designing, industrial welding techniques, fabrication capabilities and quality testing techniques.

The new campus of the institute would enhance its training quantum for higher number of trainees and also add more facilities to its technical education programme. PAEC has a professional group engaged in consultancy in the design of industrial equipment and plants like sugar plants, cement plants, chemical units, refinery equipment and mechanical workshops. The services of the institute are also available for installation of new industrial units, and upgrading of existing ones.

Talking about PAEC’s cooperation with local industry, Mr Butt said, the Commission has set up a state-of-the-art fabrication workshop, which offers assistance to local industry in manufacturing a variety of machines, equipment and plants like pressure vessels, heat exchanger, distillation towers, pressure piping, furnaces, overhead cranes, boilers, columns, heavy steel structures and other components of industrial plants. To complement these manufacturing skills, the quality assurance tools are necessary for the safety and performance guarantee to end user and PAEC, besides Pakistan Welding Institute, is also running National Center for Non-Destructive Testing (NCNDT), which imparts training to inspectors in various quality assurance testing techniques.

The Chairman and other senior officers of PAEC were briefed on the salient features of the new campus by Mr Muhammad Naeem, Manager, PWI. It will be a four-storey building consisting of two well-equipped workshops with the handling facilities of upto 10 ton capacity with the crane hook clearance of...
25 ft. for the manufacture of specialized equipment for PAEC and local industry. For the practical orientation of the trainees, a sophisticated training area supported by a modern library incorporating audio-visual aids and latest codes / standards will be provided. Metallography and chemical analysis labs. modern equipped lecture rooms and latest welding inspection & testing techniques supported by adjacent NCNDT building will make a unique blend of facilities available to local industry at one place. The new campus is planned to be completed in one year.

**National Training Course at NIBGE, Faislabad.**

**Molecular Diagnosis of Rinderpest and Other morbilliviruses**

Morbilliviruses viruses (e.g., measles & rinderpest) are of major importance in both human and veterinary medicine. In humans, measles virus remains one of the most significant causes of death in young children in the less developed pans of the world. Historically, rinderpest (cattle plague) is the most devastating disease of the cattle. Thus it has a great potential of inducing huge losses in livestock due to high monality in the affected animals.

Rinderpest virus and other morbilliviruses are difficult to differentiate antigenically because of their strong cross-reactivity and it is also difficult to distinguish them from several other viral and bacterial pathogens that share similar clinical signs. They are, therefore, ideal viruses to diagnose and characterize using polymerase chain reaction (PCR) technology.

As an assistance to the rinderpest eradication campaign of Government of Pakistan, PCR based diagnostic facilities for rinderpest and other morbilliviruses have been established at NIBGE, Faisalabad, through an IAEA Project. NIBGE is the only institute in the country where for the first time PCR based diagnostic facilities for animal diseases have been established. With a view to disseminate background information about molecular diagnosis and practical training of PCR based diagnostics of rinderpest and other morbilliviruses, a national short-term training course on molecular diagnosis of rinderpest and other morbilliviruses, was held from 3-7th Feb, 2003.

Professor Dr. Manzoor Ahmad, Vice Chancellor University of Veterinary and Animal Sciences, Lahore, inaugurated the course.

The course consisted of lectures and laboratory practicals. Sixteen participants were selected from various organizations including; Veterinary Research Institutes, Lahore and Peshawar, National Veterinary Laboratory NARC, Islamabad, INMOL Lahore, PINUM, Faisalabad, University of Veterinary and Animal Sciences, Lahore, Veterinary College Gomal University, 0.1 Khan, University of Agriculture, Faisalabad, and Army Veterinary Corps, etc.

The lectures ranged from very basic level to the state-of-the-an application of molecular diagnostics. Comprehensive background was provided about principles of Molecular Biology, DNA, RNA, Transcription & Translation, Replication, Principles of PCR, Primer designing, applications of the PCR, problems with PCR, analysis of PCR results, Preparation of samples for PCR, Optimization of PCR, Confirmation of identity of PCR product, differential diagnosis, good laboratory practices, etc.

Faculty of the course included Dr. Thomas Barrott from Institute for Animal Health, Surrey, UK who visited NIBGE as an IAEA expert, Dr. Ahmad Mukhtar Khalid, Director, NIBGE, Dr. Muhammad Afzal, Member, Animal Sciences, PARC, Islamabad, Dr. Rafaqat Hussain Raja, Animal Husbandry Commissioner, Ministry of Food, Agriculture and Livestock, Dr. Manzoor Hussain, National Consultant on Rinderpest, and Dr. Qaiser Mahmood Khan, the course organizer.

While addressing the concluding session of the course, the chief guest, Dr. Kauser Abdulla Malik, Member (Biosciences/ Admin) PAEC hoped that this course will assist in diagnostic capabilities and improvement of national epidemiological capabilities leading
to the complete elimination of the Rinderpest. He awarded certificates to the successful participants of the course. He also thanked Dr. Thomas Barrott (IAEA Expert) for visiting Pakistan and delivering lectures and providing practical training during the course.

The guests were briefed about the course by Dr. Thomas Barrett (IAEA Expert), Dr. Ahmad Mukhtar Khalid and Dr. Qaiser Mahmood Khan (Course Organizer).

Dr. Ahmad Mukhtar Khalid, Director, NIBGE, offered assistance and training required for setting up of PCR-based diagnostic at other organizations. He also highlighted the importance of research and development in the animal biotechnology field for improvement of animal health and production in the country. For the last several years, NIBGE is working on various areas of animal science including molecular biology of animal and poultry viruses. The need for setting up of a research group on "Animal Biotechnology" was emphasized.

After the completion of the course, Dr. Thomas Barrett delivered lectures at Faculty of Veterinary Sciences, University of Agriculture, Faisalabad and at National Institute for Animal Sciences, NARC, Islamabad. He also had very useful meetings with Chairman, PAEC, Mr. Parvez Butt and Dr. Kauser A. Malik. In these meetings, significance of future collaboration between NIBGE and Institute of Animal Health, Surrey, UK was highlighted.