



# *Annual Report* *of China Institute of Atomic Energy*

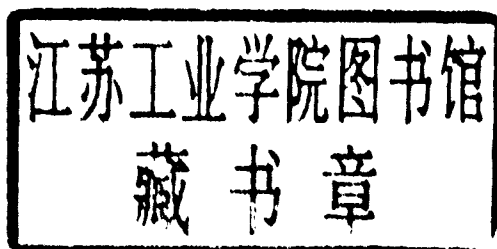
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# **Annual Report of China Institute of Atomic Energy 2005**

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# PREFACE

The favorable development conditions of China Institute of Atomic Energy (CIAE) were continuously improved in 2005. The year's task was comprehensively fulfilled and remarkable results were achieved in scientific research, construction of gigantic scientific projects and key laboratories, R&D of nuclear applications, operation of nuclear facilities and others related, which marks the 10th Five-Year Plan of CIAE has been completely realized .

## **1 Fruitful results yielded in research on science and technology**

All projects of research on science and technology undertaken in 2005 have been successfully completed and the fruitful results were yielded, which leads the CIAE Five-Year Plan of research on science and technology to come to the successful conclusion.

In the pre-studies and investigations on national defense, programs conducted in 2005 were fulfilled on schedule.

In the research and development of nuclear energy, the Five-Year Plan of basic research on physics and related technology for accelerator-driven sub-critical system(ADS), one of the projects of the major state basic research program in energy domain, had passed national review at the end of 2005 and the fruitful results have been yielded. A high current injector consisting of an ECR ion source, LEPT and a RFQ accelerating structure of 3.5 MeV has been built. The VENUS facility, a zero power sub-critical neutron multiplying assembly driven by external neutron produced from a pulsed neutron generator, has been constructed as a basic experimental platform for the neutronics study in ADS blanket. The theoretical, experimental and simulation study on nuclear data, material functions and nuclear fuel circulation related to ADS is carrying on to provide the database for ADS system analysis. The significant progresses were made in the study on advanced fuel assemblies for China PWR nuclear power plant, radiation protection and safety technique, key technology of isotope and radiation application and management technology of radioactive wastes. The qualified simulation fuel elements of MOX were obtained by comprehensive technological tests of 7 simulation assemblies. The items of a project of research on applied techniques for operating nuclear power plant were completely finished under the annual plan and some of them were prepared for engineering verification.

In the basic research, the research on physics on radioactive nuclear beam & nuclear astrophysics,

another project of the major state basic research program, has also passed the examination organized by Ministry of Science and Technology. Some achievements reached advanced world level in two sub-projects performed in CIAE. A total of 48 projects subsidized by National Natural Science Foundation are in good process of research, and 11 of them were approved in 2005.

Besides, the great progress has been made in the work of the development plan of CIAE. The comprehensive development plan for 10 years and the research plan of science and technology for 5 years have been compiled and submitted to the authority. They are processing in review. The development plan of CEFR has been included in National Mid-term and Long-Term development plan.

## **2 Significant progress in the construction of gigantic scientific projects and others related to investment in capital construction**

The detail design of China Experimental Fast Reactor (CEFR) has been completed and the first batch of reactor vessel components has been transported to the spot, which brings the project to the phase of installation and commissioning thoroughly.

The construction of China Advanced Research Reactor (CARR) went on smoothly according to the annual plan. The design and design verification have been already completed. The top layer of the main building has been also completed.

The tentative design program for both of Beijing Radioactive Ion-Beam Facility (BRIF) and China Radiochemistry Reprocessing Laboratory (CRARL) projects was compiled and submitted to the authority concerned. They are being processed in review.

The new progress was made in the construction of the key laboratories. The laboratory remake and equipment & installations purchase were fulfilled for nuclear data measurement and evaluation program key laboratory. For another key laboratory, an ionizing radiation compartment of dosing and calibration laboratory, all remake things went on smoothly. And all things were nearly finished about a project of building up an infrastructure condition for national defense science & technology industry.

The 1st phase of infrastructure facility remake went on successfully under the annual plan. The items which are remake of heating network, physical safeguards system, communication system, network and fire-fighting system have been completed and put into use. And other items which are the remake of power supply system, drainage system, sewage disposal system and so on came into the phase of installation and test.

The proposals for the projects of the remake of facility for treating radioactive wastes were

approved one by one and some were put into building up, among of which the top layer of a station for discharging of tritium contained liquid waste by atmosphere loading was constructed, and a radioactive source storage was nearly completely and the tentative design for ventilation system of radioactive wastes was compiled and put into evaluation organized by authorities concerned.

### **3 New progress made in R & D of nuclear applications**

The new progress was made in the research and development of nuclear applications again in 2005. A checking device has been successfully developed for detecting both of explosive and radioactive materials, which fills in the gaps of this method applied in antiterrorist in our country. A project of developing a flow-meter for measuring oil, gas and water has been finished and passed the examination of investor.

The industrialization of nuclear applications was developed stably and running incomes reached to 281 million RMB in the year, which brings the scheduled aims for the year of 2005 and 10th Five-Year Plan to be overfulfilled. Beijing Atom Hi Tech Co., Ltd, holding company by CIAE, went on steadily and harvested the marketing incomes of 180 million RMB and the profits of 16 million RMB. Besides, the company carried out increasing funds and enlarging stocks in March, 2005, which laid a solid foundation for the aim "connecting with capital market, making strides in company development" .

### **4 Good results achieved in work on safety continuously**

The operation of main nuclear facilities was in good condition and the annual plan of operation was overfulfilled. The heavy water research reactor ran 9 periods, more than 3 708 h. The swimming pool reactor operated 9 periods, 1 715 h. The HI-13 tandem accelerator ran 4 745 h in beam condition, and 4 036 h for scientists performing more than 40 experiments. And other facilities such as a miniature neutron source reactor, radioactive wastes disposal installations, communication and network system were in good status. The management of nuclear materials, radioactive substance and hazardous chemicals, and moreover, the safety in traffics and fire fighting was also ensured well.

### **5 Prizes, publications and patents**

A total of 6 prizes of National Defense Science and Technology Progress, 2 of 2nd grades and 4 of 3rd grades, was awarded. One physics prize named YEQISUN was awarded. Fifteen patents were applied for and 1 was commended as an outstanding patent in the year. A total of 196 theses were published and



53 were published abroad and 79 were embodied by SCI among them. Four hundred and one GF reports were compiled.

## **6 Academic exchanges**

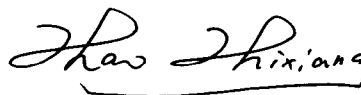
More than 4 000 guests from home and overseas were received in 2005. The international exchanges were more active. In the year, a total of 850 foreign visitors from more than 30 countries or regions were received for academic exchange or trade negotiation. And a total of 298 scientific workers were sent abroad for scientific visits, international conference or symposium and advanced training. Two agreements, one with Switzerland and the other with Korea Republic, were signed. We also successfully sponsored a Joint China-U.S. Integrated Nuclear Material Technology Demonstration.

## **7 Others**

1) The logistics work was further improved to meet the increasing demands for the supply of electricity, water, vapor, heating, goods and materials, medical treatment, accommodation and so on, which supported the scientific research and production in CIAE powerfully and made satisfaction with the logics work be raised.

2) Our management was improved a lot. A group of new management regulations and criterions were published, which guarantees our management to go towards standardization and systematization. For instance, the efficient operation on the quality management was guaranteed and quality management aims were fully realized.

Professor  
Editor in chief  
President, CIAE



June, 2006

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