

Progress Report 2005 - 2007



The **Biopharmaceutical** Program is dedicated to the research of isolation, structural analysis and biological activities in different biological systems of macromolecules. Hydrogen is seen by many as a key energetic vector for the 21st century. The **Renewable Energies** Program was established in order to contribute to the national development in this area. The **Laser Technology** Program is strongly committed to the study of laser applications on nuclear area, medicine and dentistry, industry, environment and advanced research aiming not only research but diffusion and innovation. The focus of the **Materials and Nanotechnology** Program is technology development related to processing, analysis, testing and characterization of materials in general. The Program on **Environmental Science and Technology** was structured as a consequence of the continuous growth of environmental activities on areas related to nuclear programs. The mission of **Application of Ionizing Radiation** Program is spreading and consolidating techniques that lead to the use of the radiation technology and radioisotopes applications in industry, human health, agriculture and environmental preservation. The use of radioisotopes in medicine is certainly one of the most important social applications of Nuclear Energy and the **Radiopharmacy** Program has a special place in the history of Nuclear Medicine in Brazil. The **Nuclear Reactors and Fuel Cycle** Program is fully prepared to attend the challenges that will come with the retaking of the Brazilian nuclear program. Some of the products and services offered by **Nuclear Science and Technology** Program find their way to petroleum, aeronautical, space and semiconductor industries, medical clinics and hospitals, environmental agencies, universities and research institutes. In association with the University of São Paulo (USP), the **Education** Program, established in 1976, is organized in three areas of concentration: Nuclear Technology on Applications, Materials and Reactors.

Progress Report 2005 - 2007



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Instituto de Pesquisas Energéticas e Nucleares
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Martha Marques Ferreira Vieira; Mery P. Zamudio Igami

Technical editing support

Maria Tereza de C. Barros de Sousa

Graphic project and editing

Katia Itioka

Martha Marques Ferreira Vieira

Mery P. Zamudio Igami

Photos

Edvaldo Fonseca

Marcello Vitorino

IPEN scientific and clerical staff

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Our mission is to improve the Brazilian people quality of life by producing scientific knowledge, developing technologies and services and promoting human resources for nuclear and correlated areas.



Lake at IPEN location

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Foreword

The period considered in this report, from 2005 to 2007, comprehends three remarkable events to the Nuclear and Energy Research Institute - IPEN.

The first one was the celebration of the 50th anniversary, on August 2006. During this half century, many activities developed here were devoted to the improvement of the quality of life of the Brazilian society, like the production of radiopharmaceuticals for diagnostic and therapeutic procedures in nuclear medicine: the production of the FGD-18 radiopharmaceutical, used for Positron Emission Tomography PET and PET-CT diagnostics are the main ones. Due to this production, Brazil reached over 3 million nuclear medical procedures.

The nuclear reactor IEA-R1 also completed fifty years of operation, on September 2007. It was constructed during the program "Atoms for Peace" and it is considered a model of its class, being engaged in basic research and radioisotopes production since the very beginning.

The Nuclear Technology Graduate Program of IPEN, in association with the University of São Paulo USP, completed 30 years on March, 2006. It is considered a program of Excellence - an international level course - and awarded 937 master degrees and 458 doctor degrees till December 2007.

The progress and main outcomes of the research developed at the 10 R&D Centers and the Radiopharmacy directory are presented in this report, according to main activities programs: Radiopharmacy, Application of Ionizing Radiations, Nuclear Science and Technology, Nuclear Reactors and Fuel Cycle, Renewable Energies, Materials and Nanotechnology, Biotechnology and Lasers Technology.

It must be stressed that all these results were accomplished as a result of the efforts and dedication of the IPEN staff and the support from CNEN, MCT, SD/SP, IAEA, FAPESP and CNPq.

The institute was conducted by Dr. Claudio Rodrigues in the period covered in this report.

Dr. Nilson Dias Vieira Junior
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Short Profile

IPEN - Nuclear and Energy Research Institute is a State of São Paulo autarchy, associated to the University of São Paulo - USP for educational purposes and supported and operated technically and administratively by the National Nuclear Energy Commission - CNEN, a federal agency of the Ministry of Science and Technology.

The Institute was founded in 1956 with the main purpose of doing research and development in the fields of nuclear energy and its applications. It is located at the campus of USP, in the city of São Paulo, in an area of nearly 500,000 m². It has over 1000 employees and 40% of them have qualification at master or doctor level.












IPEN is recognized as a national leader institution in research and development in the areas of radiopharmaceuticals, industrial applications of radiation, basic nuclear research, nuclear reactor operation and nuclear applications, materials science and technology, laser technology and applications.

Along with the R&D, it has a strong educational activity, having a graduate program in Nuclear Technology, in association with the University of São Paulo, USP, ranked as the best university in the country. The Federal Government Evaluation institution CAPES, granted to this course grade 6, considering it a program of Excellence. This program started at 1976 and has awarded 458 Ph.D. degrees and 937 master degrees since then. The actual graduate enrollment is around 400 students.

The internal organization structure comprehends two levels, one for strategic and political issues and for decisions making, composed by its a Board and a Technical and Administrative Council - CTA and another for the executive and operational actions, coordinated by the Research and Development Centers, grouped according to their research, development and innovation activities.

IPEN has a rigorous program of radiological control and nuclear safety for the activities related to nuclear and radiological aspects. This program comprises personal and environmental monitoring and radiological emergency assistance.

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Instituto de Pesquisas Energéticas e Nucleares

Av. Prof. Lineu Prestes, 2.242 - Cidade Universitária
São Paulo - CEP 05508-000
Tel.: (0XX11) 3133-9000- Fax: (0XX11) 3812-3546
<http://www.ipen.br>