## AUTOMATION SYSTEM FOR QUALITY CONTROL IN THE MANUFACTURING OF IODINE-125 SEALED SOURCES USED IN BRACHYTHERAPY

Samir L. Somessari, Anselmo Feher, Francisco E. Sprenger, Maria Elisa C. M. Rostellato, João A. Moura, Osvaldo L. Costa, Wilson A. Parejo Calvo

somessar@ipen.br; afeher@ipen.br; sprenger@ipen.br; elisaros@ipen.br; jmoura31@yahoo.com.br; olcosta@ipen.br; wapcalvo@ipen.br

National Nuclear Energy Commission Institute for Nuclear and Energy Research IPEN-CNEN/SP Av. Prof. Lineu Prestes, 2242 05508-000 - Sao Paulo, SP - Brasil

The aim of this work is to develop an automation system for Quality Control (QC) in the production of iodine-125 sealed sources, after undergoing the process of Laser Beam Welding (LBW). These sources, also known as iodine-125 seeds are used, successfully, in the treatment of cancer by brachytherapy, with low-dose rates. Each small seed is composed of a welded titanium capsule with 0.8 mm diameter and 4.5 mm in length, containing iodine-125 adsorbed on an internal silver wire. The seeds are implanted in the human prostate to irradiate the tumor and treat the cancerous cells. The technology to automate the quality control system in the manufacturing of iodine-125 seeds consists in developing and associate mechanical parts, electronic components and pneumatic circuits to control machines and processes. The automation technology for iodine-125 seed production developed in this work employs Programmable Logic Controller (PLC), step motors, drivers of control, electrical-electronic interfaces, photoelectric sensors, interfaces of communication and software development. Industrial automation plays an important role in the production of Iodine-125 seeds, with higher productivity and high standard of quality, facilitating the implementation and operation of processes with Good Manufacturing Practices (GMP). Nowadays, the Radiation Technology Center at IPEN-CNEN/SP imports 36,000 iodine-125 seeds per year and distributes them for clinics and hospitals in the country. However, the Brazilian potential market is of 8,000 iodine-125 seeds per month. Therefore, the local production of these radioactive seeds has become a priority for the Institute, aiming to reduce the price and increase the supply to the population in Brazil.