

# Comissioning of the new Heat Exchanger for the Research Nuclear Reactor IEA-R1.

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## ABSTRACT

*The Research Reactor IEA-R1 placed at IPEN/CNEN-SP is of the swimming pool type, light water moderated and with graphite reflectors, and was build and designed by Babcock & Wilcox Co. Start up operation was in September the 16<sup>th</sup>, 1957, being the first criticality in South Hemisphere. Although designed to operate at 5 MW Power, the IEA-R1 was updated in 2001 to 2 MW operation and suitable for use in basic and applied research as well as the production of medical radioisotopes, industry and natural sciences. Due to a recent demand increase on radioisotopes in Brazil for medical diagnoses and therapies applications, IPEN in cooperation with CNEN updated the IEA-R1 potency to 5 MW and to work at continuous operation regime. Studies on the Ageing Management for the Research Reactor IEA-R1 were conducted according to IAEA procedures described in the technical report 338 (IAEA, 2001) and technical document 792 (IAEA, 1995). As result of these studies critical components within the Ageing Management Program were identified. Also recommendations on the implementation of a test schedule and a procedure to organize data and documents were made. The main result was the need to monitoring both heat exchangers, the two primary pumps and the data acquisition system. Along the monitoring process, difficulties were observed to operate the Reactor at 5 MW mainly due to the ageing of the TCA heat exchanger, Babcox&Wilcox, and vibration problems at high flow rates on TCB heat exchanger, by CBC. From 2005, it was chosen to work with 3,5 MW and to provide a new heat exchanger with 5 MW capacity , fabricated by IESA , to substitute the TCA heat exchanger. This work presents results on the commissioning of the new heat exchanger and compares to the values calculated on the Project. The results show that the IEA-R1 Reactor can be operated safety and continuously at the Power of 5 MW with the new heat exchanger.*

*“Technical Report 338 , Methodology for the Management of Ageing of Nuclear Power Plant Components Important to Safety” and Technical Document 792, ”Management of Research Reactor Ageing”.*

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