An on line remote level radiation monitoring system for the Brazilian IEA-R1 nuclear research reactor building for routine surveillance and as an important tool in the case of a radiological emergency

José P. N. Cárdenas, Christovam R. Romero Filho and Tufic Madi Filho

Comissão Nacional de Energia Nuclear - Instituto de PesquisasEnergéticas e Nucleares

Body of Abstract: Nuclear facilities must measure radiation levels with aim to establish procedures for radiological protection staff involving workers and general public.
The Instituto de Pesquisas Energéticas e Nucleares – IPEN has 5 importants plants and in the case of an accident in one of them, the Institute keeps operational an Emergency Response Plan (PER). This document (PER) is designed to coordenate all procedures being done intending to assure safety and security conditions for general people, enviroment and workers.
One of this plants is the IEA-R1 reactor, it is the oldest nuclear research reator (an open swimming pool type) in Latin America, reached it first criticality in September of 1957. It is used in a 60 hours a week of continuous operation and a nominal 2 MW with technical conditions to operate at 5 MW thermal power.
This reactor has a Radiological Emergency Plan that establishes the implementation of rules for workers and general people living at the exclusion area in the case of an emergency situation.
This paper aims to describe the implementation of a computacional system developed for remote radiation monitoring, in a continuous schedule of IEA-R1 nuclear research reactor containment building. Results of this action are used as a support means in a radiological emergency. Thus, are described all of necessary modules for radiation detection, signals conditioners and processing, data adquisition board, Software development, computer especifications and uncertainties analysis on radiation measurements as well.
The data aquisition system operating in this reactor shows readings concerned to radiation enviroment, such as activity, dosis and concentration in real time and displays a periodical data bank (DataBase) of this features allowing through the surveillance of the operation records anytime, leading to studies and analysis of radiation levels.
Result of this data acquisition are shown by means of computer graphics screens developed for windows enviroment using Visual Basic software