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THE USE OF EISENIA FETIDA AS BIOINDICATOR OF NUCLEAR ACTIVITIES

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Environmental sampling is one of the most important measures to strengthen the nuclear safeguard system. The collection of environmental samples, in context of the safeguard, aims to reveal information on treated materials and declared or even undeclared activities, as well. Usually two steps are involved, the first to establish the environmental fingerprint of the installation under observation, the second is to obtain compared these values with the environmental signatures. This strategy can also be used in nuclear forensic investigations. Samplings can be performed inside, outside or even near the facility under investigation, on surfaces, air, water, sediments, vegetation, soil and the local biota. In soil the earthworm is part of the biota, assimilating the metallic components during feeding or by skin absorption. The *Eisenia fetida* earthworm belongs to the Annelida Phylum, Oligochaete Class, the species known as California redworm, in Brazil, is widely used for the production of humus, since it has great ability to convert little decomposed organic residues into stabilized material. In the literature it has been already reported the ability of *E. fetida* to bioaccumulate several metals including uranium and other radionuclides. In this project we are studying the ability of *E. fetida* to identify nuclear signatures and its ability to be used as biomonitor in nuclear safeguards and nuclear forensic investigations.

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CFD ANALYSIS OF BLOCKAGE LENGTH ON A PARTIALLY BLOCKED FUEL ROD

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In LOCA accidents, fuel rods may balloon by the increasing of pressure difference between fuel rod and core vessel. With the balloon effect, the swelling can partially block the flow channel, affecting the coolability during reflood phase. In order to analyze the influence of blockage length after LOCA events, many numerical simulations using Ansys-CFX code have been done in steady state condition, characterizing the final phase of reflood. Peaks of temperature are observed in the middle of the fuel rod, followed by a temperature drop. This effect is justified by the increasing of heat transfer coefficient, originated from the high turbulence effects. Therefore, this paper considers a radial blockage of 90%, varying just the blockage length. This study observed that, for the same boundary conditions, the longer the blockage length