

Public Abstract

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Department:Electrical Engineering

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Title:PRACTICAL EXPERIMENTS AND SIMULATIONS FOR NUCLEAR SAFEGUARDS EDUCATION

Recently the University of Missouri-Columbia has implemented a Nuclear Safeguards graduate certificate to help satisfy the need for increased accountability in the growing field of nuclear technology. In order to fulfill partially the requirements of this certificate, a Nuclear Safeguards Science and Technology course has been established to link the concepts of nuclear science with those of nuclear security. Classes have already been available to teach a student the nature and properties of nuclear material as well as their nonproliferation risks and other associated hazards. However, this new course strives to provide access to the methods and principles that connect the concepts of nuclear science with their applications to the safeguarding of nuclear materials.

The three primary aspects of nuclear safeguards are material protection, control, and accountability. First, a tool is developed based on a spreadsheet that predicts the effectiveness of a protection system to aid in designing said systems. Secondly, an example laboratory experiment is presented that shows a calibration of a hand-held radiation detector for the use in preventing nuclear material theft. Finally, a program is described that can simulate gamma ray spectra for nuclear material, which can be used to determine what and how much material is in a radioactive sample.