

## **NCRP Commentary No. 21, *Radiation Protection in the Application of Active Detection Technologies***

NCRP Commentary No. 21, *Radiation Protection in the Application of Active Detection Technologies*, reviews the new remote detection technologies that are being developed, focusing on the requirements for radiation protection and provides guidelines to ensure that doses are within recommended limits for operating personnel and bystanders in the inspected areas.

With the threat of terrorism, concerns about the use of special nuclear material (SNM) in terrorist acts are high. Billions of dollars have been appropriated in the United States for the development and deployment of new technologies to monitor SNM within the United States and overseas. The U.S. Congress has enacted laws requiring that containers be scanned by imaging and radiation detection equipment before loading onto vessels in foreign ports, with the intention of preventing terrorists from smuggling SNM into the country.

Detection of SNM can impede a terrorist nuclear attack in two ways: deterrence and defense. A successful detection capability, in combination with the inherent difficulties of constructing an effective nuclear weapon, could convince adversaries that any attempt to launch an attack with such a weapon will fail or that such an attack would be too complex to execute. These consequences could dissuade them from action. If, however, deterrence fails, detection systems would be needed, allowing the discovery and interdiction of SNM to prevent its use. The detection technologies could be used to search vehicles, structures, containers, and possibly individuals for SNM at border crossings, transit routes, and other locations of concern.

The U.S. government is actively pursuing efforts to develop, acquire and support the deployment of enhanced detection systems for SNM. While the Domestic Nuclear Detection Office in the U.S. Department of Homeland Security is the lead agency in this area, both the U.S. Department of Energy and the Defense Threat Reduction Agency (DTRA) in the U.S. Department of Defense support programs to develop and field an active detection technology (ADT) system. This Commentary focuses on the efforts of DTRA to deploy a detection system that addresses their mission. It is intended as guidance to inform the development process with respect to radiation protection issues. The comments and recommendations in this Commentary are broadly applicable to all ADTs used to detect SNM.

Section 1 puts the requirement for the new ADT systems into context and provides an overview of other security screening and contraband detection systems that have previously been reviewed by NCRP. Section 2 describes the basic characteristics of the possible ADTs. Section 3 reviews radiation effects and considers dose limits related to the use of ADT systems. Section 4 discusses radiation protection requirements as they relate to ADTs. Section 5 focuses on the ethical considerations and communication requirements associated with use of ADT systems. Section 6 presents a summary of the key points and recommendations in this Commentary.

The Commentary is available from the NCRP website, <http://NCRPpublications.org>, in soft- and hard-copy formats. For additional information contact David A. Schauer, ScD, CHP at [schauer@NCRPonline.org](mailto:schauer@NCRPonline.org), 301.657.2652 (x20) or 301.907.8768 (fax).