

Memo on the Radiation Safety of NSDD RPMs

NSDD radiation portal monitors contain no radioactive sources and emit no radiation

NSDD radiation portal monitors (RPMs) use completely passive radiation detection technologies, whereby they only detect external sources of radiation. Unlike x-ray scanners, RPMs do not contain any internal sources of radiation, nor do they contain any components that produce radiation. There is no radiation hazard to people who pass through the RPMs or to anyone standing near the RPMs. NSDD-deployed Rapiscan and Aspect RPMs (including their gamma and neutron detectors) do not present a radiation safety hazard.

Purpose of an RPM

The purpose of NSDD RPMs is to detect radiation emitted by radioactive materials that are transported by pedestrians or in vehicles or cargo containers. The RPM alarms when the radiation level measured by the RPM is higher than the radiation level from the natural background.

Components of an RPM

The basic parts of NSDD RPMs are the passive gamma and neutron detectors, electronic circuits to make alarm decisions, and power supplies for the detectors and electronics. Other system components are used to facilitate operations and communicate alarm decisions and system status to a central alarm station.

Basics of RPM radiation detection

NSDD gamma detector assemblies use a scintillating plastic. A gamma ray from an external source interacts with the scintillating plastic and produces a photon of light that is converted to an electron and is then amplified, creating a current pulse. NSDD neutron detector assemblies use either ^3He , ^6Li , or ^{10}B . Regardless of the detector material used, a neutron interacting with the material ultimately produces a current pulse.

The processing electronics convert the current pulses from the detector assemblies into count tallies as a function of time, which are then used by the RPM controller firmware to determine whether there is a significant increase in the levels of external radiation above those that are a result of the background environment where the RPM is located. The settings that NSDD has established for the processing electronics have been chosen to maximize the sensitivity of the RPMs to special fissionable material (SFM).

Passive detectors like these do not emit any radiation and do not present a radiation hazard to pedestrians, vehicle occupants, or RPM operators. Rather, they are used only to improve security by alerting an operator to when an external source of radiation is passing through.

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