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Field Testing of Unattended Environmental Sampling Devices and Analysis Results

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Researchers at Savannah River National Laboratory (SRNL) and Oak Ridge National Laboratory (ORNL) have been developing a tamper resistant/tamper indicating aerosol contaminant extractor (TRI-ACE) to be used for unattended environmental sampling in support of safeguards applications. Environmental sampling has become a key component of International Atomic Energy Agency (IAEA) safeguards approaches by supporting conclusions concerning the absence of undeclared nuclear material or nuclear activities in a State. Swipe sampling is the most commonly used method for the collection of environmental samples from bulk handling facilities. However, augmenting swipe samples with an air monitoring system, which could continuously draw samples from the environment of bulk handling facilities, could improve the possibility of the detection of undeclared activities. Continuous, unattended sampling offers the possibility to collect airborne materials before they settle on surfaces which can be decontaminated, taken into existing duct work, filtered by plant ventilation, or escape via alternate pathways. The TRI-ACE system will allow for such collection in a manner that ensures sample integrity. The TRI-ACE prototype, which was completed in early 2013, has many features which could indicate possible tampering events that may have occurred during unattended collection.

In 2013, a team traveled to a U.S. facility to field test the TRI-ACE alongside a standard ACE unit. The goals of the field trial were to evaluate the effectiveness of the TRI-ACE system in unattended monitoring of airborne particulate, and to establish the effectiveness of ACE collection versus swipe collection. The samples collected were processed using various techniques, including mass spectroscopy. If the collection plates and swipes provided accurate analysis, the system could potentially be deployed by the IAEA at uranium-handling facilities as a safeguards measure. This paper will discuss the field trial results found by the team from SRNL and ORNL.

Country or International Organization

United States of America

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