

Radiological Material Security in Large Panoramic Irradiators: Lessons Learned

Monday 10 February 2020 15:15 (15 minutes)

Large Panoramic Irradiators (LPI) are widely used to sterilize medical supplies, food products, spices, cosmetics, and other consumable goods. LPIs typically use a large array of cobalt (Co-60) sources to expose the products to gamma radiation. Co-60 is desirable to terrorist and criminal organizations that are interested in developing a radiological dispersal device (RDD) or radiological exposure device (RED). It is often believed that the LPI Co-60 provides an adequate level of self-protection because of the large radiation dose associated with the source array. This is not true in all scenarios and operational conditions. One typical LPI site with a one-source pool may contain up to 3 million curries (Ci) of cobalt. Approximately 50 commercial irradiators are in operation in the United States and over 200 are in operation worldwide. The United States Department of Energy/National Nuclear Security Administration's Office of Radiological Security (ORS) is collaborating with LPI facilities to protect Co-60 with the goal of preventing the unwanted removal and misuse of the source material.

This paper will focus on the efforts by ORS to protect LPI sites from a successful theft of Co-60 and will include key lessons learned. These efforts include improving the performance of detection and delay systems to provide local law enforcement the ability to respond to an attack on the facility in a timely manner, which will prevent the removal of the source material. The protection strategy is to develop continuous and balanced layers of security measures. This objective is achieved through security upgrades to access control, intrusion and detection systems, and delay features.

ORS is currently working with several LPI industrial partners to implement the protection strategy. ORS worked with LPI partners over several years to develop a mutually acceptable base-line design and implementation process. The design is based on facility assessments, system analysis, component testing, and prudent security practices. For each facility, ORS and partners consider the operational aspects of each facility to develop protection enhancements that minimize any impact to efficiency and effectiveness of the LPI production process.

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

Gender

State

United States

Author: Mr SANDOVAL, Martin (Sandia National Laboratories)

Co-author: Mr BAUMANN, Mark (Sandia National Laboratories)

Presenter: Mr SANDOVAL, Martin (Sandia National Laboratories)

Session Classification: Physical protection systems: evaluation and assessment

Track Classification: PP: Physical protection systems: evaluation and assessment