Protection and Security of Radiation Sources

Keeping radioactive materials out of the hands of terrorists is a top priority for the Nuclear Regulatory Commission. The NRC and its Agreement States[1] have in place a multi-layered, comprehensive security program to protect these sources. This program has been effective, keeping incidents to a minimum and their consequences low. Most lost or stolen sources are quickly found, with little or no radiation exposure or contamination. The NRC continues to work at home and abroad to make risk-significant radiation sources[2] even more secure. The United States was the first country to require enhanced security measures for radioactive sources, and the NRC continues to lead the world in source security.

Benefits of Sources

A "source" is a piece of radioactive material produced in a nuclear reactor. Sources are isotopes such as cobalt-60, iodine-131, cesium-137 or americium-141. The radiation they emit is useful in a variety of ways in industry, medicine and research. For example:

- Gauges measure the moisture in soil during construction of roads and buildings, or the flow of liquids through pipes.
- Radiography cameras detect structural flaws in buildings or pipe welds.
- Irradiators sterilize medical equipment and blood, or eliminate pests from food.
- Well-logging devices help map oil and natural gas deposits.
- Isotopes used in medicine can detect or treat thyroid issues and cancer, such as brain tumors.

Strong Security Requirements

At first, the security requirements for sources focused on avoiding unintended radiation exposures to workers or the public. Today, they aim to keep sources out of the hands of terrorists. These security measures suit the facilities where sources are stored and the level of risk they pose. They have multiple layers, a flexible framework and reflect the NRC's strong commitment to ensuring the security and control of sources.

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[1] The NRC has signed agreements with many states, under which the NRC relinquishes authority to license and regulate radioactive materials used in industry, medicine and research.

[2] The NRC defines "risk-significant sources" as those listed in Category 1 and Category 2 of the International Atomic Energy Agency's "Code of Conduct on the Safety and Security of Radioactive Sources."

Key elements of the program include:

- Background checks, including fingerprinting, to ensure that people with access to sources are trustworthy and reliable.
- Physical barriers and personnel access controls to areas where sources are stored or used.
- Security plans and procedures to detect, deter, assess and respond to unauthorized access attempts.
- Coordination and response planning between licensees and local law enforcement agencies.
- Coordination and tracking of shipments of radioactive material.
- Security barriers to discourage theft of portable devices containing radioactive material.
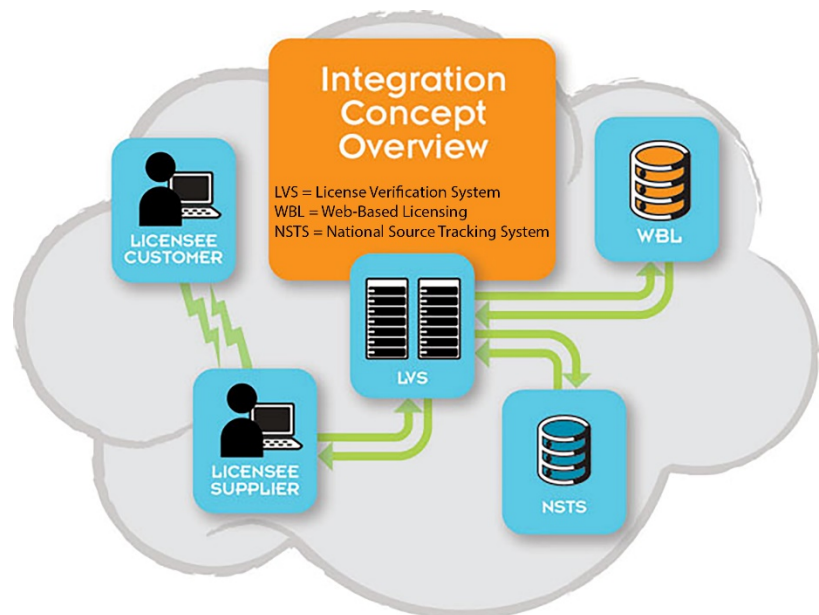
The NRC and the Agreement States regularly inspect licensees to ensure their security programs meet these requirements and the materials remain secure. While there have been no specific, credible threats against radioactive sources, the NRC remains vigilant. Agency security experts coordinate with other federal agencies and the intelligence community to counter any threat that may arise.

Many of these requirements were spelled out in Orders the NRC and the states began to issue in 2005. The NRC incorporated them into a final rule, 10 CFR Part 37, "Physical Protection of Byproduct Material," published in March 2013. The rule includes lessons learned from implementing the orders, plus new requirements for things such as training for staff and notifying the NRC.

Managing Source Information

The National Source Tracking System is a secure database that tracks the most risk-significant sources from manufacture or import through disposal or export. Licensees enter the receipt, transfer or disposal of sources into the database, so the NRC knows where the sources are. This information also helps the NRC respond during natural disasters such as floods or hurricanes.

Integration Concept Overview

LVS = License Verification System
WBL = Web-Based Licensing
NSTS = National Source Tracking System

LICENSEE CUSTOMER
LICENSEE SUPPLIER
WBL
LVS
NSTS

The NRC has also put in place a Web-Based Licensing system and a License Verification System. The three systems work together to provide federal and state officials with information on about 1,400 NRC and Agreement State licensees and the more than 77,000 risk-significant sources they possess. They make information available to other federal and state agencies with a role in protecting the nation from nuclear and radiological threats. They track all those authorized

to possess sources, allow licensees to verify that information before transferring sources, and help alert regulators to any discrepancies in source inventories.

Partnership with Other Agencies

The NRC and Agreement States regularly inspect materials licensees to ensure they are meeting safety and security requirements. The Department of Energy's National Nuclear Security Administration retrieves and disposes of unused or abandoned sources. NNSA and NRC also work with licensees to promote voluntary enhancements to the NRC's already robust security requirements so that the most risk-significant sources remain secure and available to perform their beneficial roles for society.

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