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OFFICE OF FEDERAL & STATE

MATERIALS & ENVIRONMENTAL

MANAGEMENT PROGRAMS

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Unwanted Irradiator Sources

Manufacturers have incorporated relatively high activity sources of cesium-137, cobalt-60, and iridium-192 in irradiators used in medicine and industry for purposes ranging from blood irradiation to food sterilization. Because the effectiveness of these irradiators is directly related to their radioactivity, service life diminishes with time. Management of sources that are no longer useful in a given application is becoming an increasing challenge for licensed users. While it is desirable to return sources to vendors or recycle and reuse residual radioactive material, the options are not always possible. In some cases, disposal is the best option. Unfortunately, disposal of sealed sources at commercial low-level waste (LLW) sites in the United States is complicated by two factors—access limitation and high disposal costs.

Both compact law and site waste acceptance criteria limit access to disposal sites. Under the Low-Level Radioactive Waste Policy Amendments Act of 1985, States that enter into interstate agreements, known as compacts, are granted the authority to exclude LLW from States outside their compact. Under this law, a licensee in Nebraska could be prevented from disposing of a source at the commercial site in Washington, because Nebraska is not part of the Northwest compact. Waste acceptance criteria, unlike compact restrictions, are primarily driven by U.S. Nuclear Regulatory Commission's (NRC) waste classification system in Title 10 of the Code of Federal Regulations (10 CFR) Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." LLW is classified as Class A, B, C, or greater than Class C (GTCC) based on potential hazard and intended need for control and isolation. By law, States are responsible for disposal of Class A, B, and C LLW. The U.S. Department of Energy (DOE) is ultimately responsible for the disposal of GTCC LLW. DOE is in the process of completing an environmental impact statement for a GTCC disposal implementation strategy. In addition to LLW classification limitations, States that regulate LLW disposal may impose additional restrictions based on site specific conditions. Because of their relatively high radioactivity and small mass or volume, many irradiator sources are considered GTCC and do not meet the criteria for commercial disposal, even if they are within a sited compact. Further, DOE is not yet in the position to accept GTCC sources for disposal.





In cases in which irradiator sources do meet LLW disposal site waste acceptance criteria and are allowed by the host compact and State, disposal cost rates are likely to be high. Disposal cost rates are typically based on a complex formula that accounts for size, radioactivity, dose rate, and handling and processing challenges. Though physically small, the other factors used in setting disposal rates can result in disposal cost for an individual source to total tens of thousands of dollars. In addition, the cost of leasing certified packages, which are required for higher-activity shipments, can typically range in the tens to hundreds of thousands of dollars.

One potential relief for licensees may be the Global Threat Reduction Initiative OffSite Source Recovery Project (GTRI/OSRP), which is part of DOE's National Nuclear Security Administration (NNSA). This program is designed to identify and manage radioactive sealed sources that would represent a security threat if used in a radiological dispersal device (commonly referred to as a "dirty bomb"). These include Categories 1 and 2 quantities of radioactive sources listed in the International Atomic Energy Agency's "Code of Conduct on the Safety and Security of Radioactive Sources" (code of conduct), as well as aggregations of lower activity sources. The Categories 1 and 2 quantities of radioactive sources listed in the code of conduct are considered the most risk-significant and have been the focus of Federal and State efforts to place tighter controls for security. Disused and unwanted medical and industrial sources should be registered through the GTRI/OSRP secure Web site, <http://www.osrp.lanl.gov>. Information on disused sources that do not qualify for recovery by GTRI/OSRP is shared with the Conference of Radiation Control Program Directors (CRCPD) Source Collection and Threat Reduction (SCATR) Project. NNSA/GTRI funds the SCATR Project, but it is administered by CRCPD. SCATR helps licensees use commercially available disposal options and may, in certain cases, offer financial assistance as needed to generators that participate in the SCATR program. In addition, the NRC funds the CRCPD's Orphan Source Project which complements other efforts and focuses exclusively on orphan sources.

The GTRI and CRCPD projects have been effective in reducing the threat posed by disused and unwanted sources. Also, current Federal and State regulations and inspection programs provide assurance that these disused sources remain secure while in long-term storage. However, more efforts are needed to comprehensively and sustainably address this national security challenge since disposal is considered the most secure management approach. Several efforts are underway at both the U.S. Federal Government interagency level and at the State and compact level to expand options for addressing these industrial and medical sources in the interest of national security. The NRC is very engaged in these efforts. All parties acknowledge that there is not one solution, nor can one State, compact or agency solve this problem alone. Furthermore, sustainable and comprehensible solutions will need to address both front-end and end-of-life management of sealed sources.

In the United States, beneficial use of medical and industrial sources, while vital, lends itself to significant challenges regarding the end-of-life management of these sources. Such management ultimately requires the cooperation of a number of entities at both the State and Federal level. The NRC remains committed to working with NNSA, CRCPD, compacts and other interested parties in finding solutions to this important national security issue. Details regarding the disposal challenges, as identified above, are found in the Interagency's 2010 Radiation Source Protection and Security Task Force (task force) report to the President and Congress at <http://www.nrc.gov/security/byproduct/2010-task-force-report.pdf>. The task force activities have been the primary vehicle for advancing issues related to the domestic security of radioactive sources from potential terrorist threats. Since the task force provides a report to the President and Congress every 4 years, per legislative mandate, the task force will provide a status update on source recovery and disposition in 2014.

(Contact: James Shaffner, FSME, 301-415-5496 or James.Shaffner@nrc.gov or Kim Lukes, FSME, 301-415-670 or Kim.Lukes@nrc.gov)