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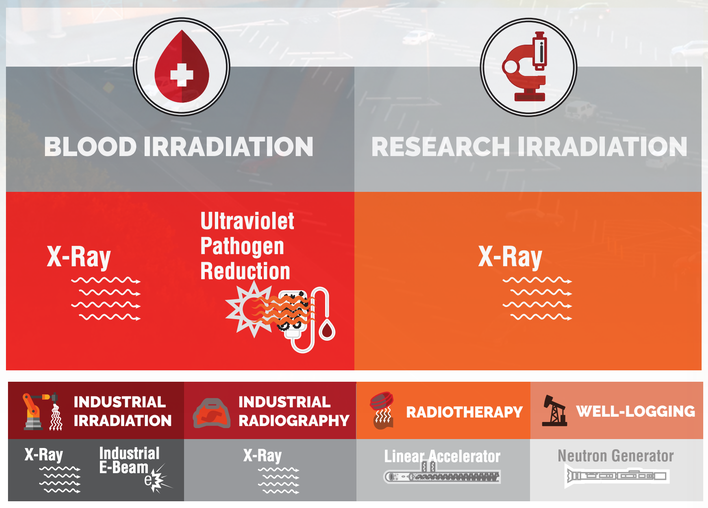
What Are "Alternative Technologies"?

Application Examples

- Blood Irradiation
- Research Irradiation
- Sterile Insect Technique
- Food/Phytosanitary Irradiation
- Radiotherapy
- Medical Device Sterilization
- Plastic polymerization

Alternative Technology Examples

- Self-shielded X-ray Irradiators (generators)
- Industrial E-Beam & X-ray Conversion
- Linear Accelerators (LINAC)
- UV Pathogen Reduction
- Neutron Generators



Benefits

- Mitigation of risks, costs and procedures associated with radioactive sources. Elimination of the liability risk associated with cesium-137 devices.
- Potential for expanded capabilities or technical performance.
- Reprieve from complicated and costly end-of-life disposition

New applications & technologies yet to emerge...

Cesium Irradiator Replacement Project Scope

420	332	20	83
Cs-137 based blood irradiators *in the US at the start of CIRP in 2015*	**Cs-137 based research irradiators** *in the US at the start of CIRP in 2015*	**Co-60 based blood irradiators** *in the US at the start of CIRP in 2015*	**Co-60 based research irradiators** *in the US at the start of CIRP in 2015*

Cesium Irradiator Replacement Project

A **voluntary** initiative offering financial incentives to U.S. licensees who choose to replace Cs-137 self-shielded irradiators with alternative technologies.

Sites Receive:

- Removal of the Cs-137 device through the Off-Site Source Recovery Project (OSRP)
- A financial incentive toward the purchase price of an X-ray machine (typically 50%)

Progress to Date

120 *irradiators replaced*

30% *of the U.S. inventory currently being replaced*

JOHN S. MCCAIN NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2019 — August 13, 2018

SEC. 3141. Acceleration Of Replacement Of Cesium Blood Irradiation Sources.

(a) GOAL — The Administrator for Nuclear Security shall ensure that the goal of the covered programs is eliminating the use of blood irradiation devices in the United States that rely on cesium chloride by December 31, 2027 through a voluntary program.

Irradiator Replacement Initiatives

Initiative	Irradiator Application	Irradiators to be Replaced
University of California	Mostly research	90%
New York City	Blood & Research	75%
Atlanta	Blood & Research	66%
Vitalant	Blood	100%

Research, Studies & New Ideas

Collaboration with NNSA Office of R&D

- Small Business Innovative Research (SBIR)
- DOE Labs, universities

Technology research comparison studies

- Research Irradiation and Dosimetry

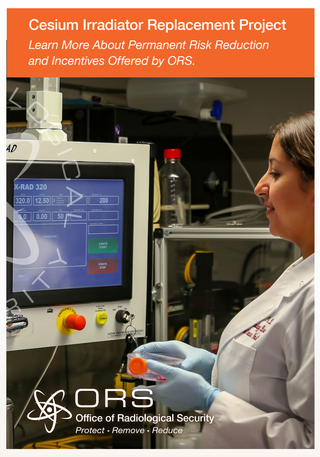
Policy & industry landscape studies

- Non-radioisotopic Alternative Technologies White Paper, 2019
- Task Force on Radiation Source Protection and Security, 2018 (latest)

Technology demonstration projects

- Flat Panel X-Ray Source

Outreach and Education



Organize targeted workshops to increase awareness of security concerns and technology options:

- 10 US workshops in 2 years
- 15+ international events
- New York City, University of California, Dallas-Fort Worth, Boston

Provide educational materials via websites, email, Twitter, handouts:

- Brochures and fact sheets
- Videos

Present papers or exhibit booths at industry conferences:

- IAEA
- Institute for Nuclear Material Management
- AABB
- Health Physics Society
- U.S. Organization of Agreement States
- International Meeting on Radiation Processing

Meet directly with source users to discuss source security and technology options, including source alternatives.

Sandia National Laboratories

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NNSA National Nuclear Security Administration

ORS Office of Radiological Security Protect · Remove · Reduce