



ORS

Office of Radiological Security

Protect · Remove · Reduce

ORS Alternative Technologies Program

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Presented by:
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Director



Global
Material
Security



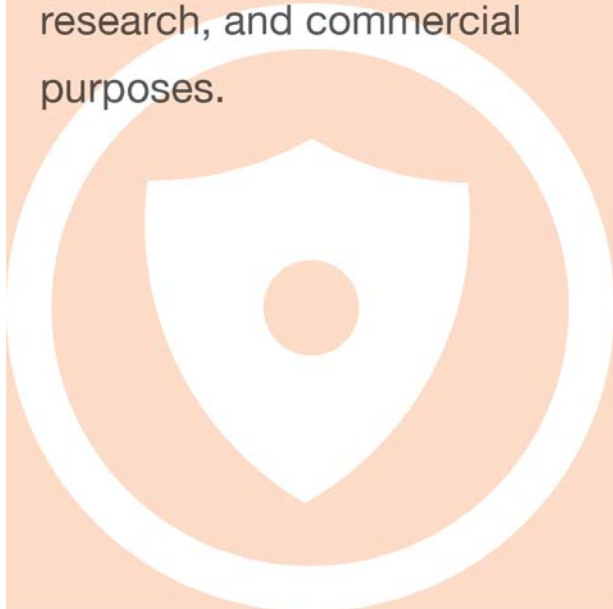
Office of Radiological Security

Mission

Enhance global security by preventing high-activity radioactive materials from being used in acts of terrorism.

PROTECT

Protect radioactive sources used for vital medical, research, and commercial purposes.



REMOVE

Remove and dispose of disused radioactive sources.



REDUCE

Reduce the global reliance on high-activity radioactive sources by promoting the adoption and development of non-radioisotopic alternative technologies.



What Are “Alternative Technologies”?

Technologies which do not contain radioactive materials that perform an equivalent (or better) function as a comparable device

Alternative technologies may emit ionizing radiation, like **x-ray irradiators**, or they may not, like **UV pathogen reduction systems**.

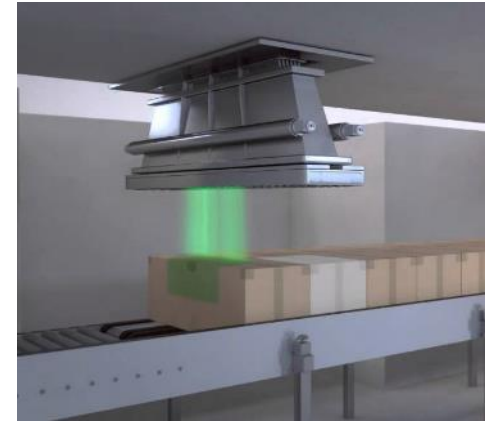
Application Examples

- Blood Irradiation
- Research Irradiation
- Sterile Insect Technique
- Phytosanitary Irradiation
- Radiotherapy
- Medical Device Sterilization



Alternative Technology Examples

- X-ray irradiators
- Industrial E-Beam/X-ray
- Linear Accelerators
- UV Pathogen Reduction



Cesium Irradiator Replacement Project (CIRP)

- Removal of disused Cs-137
- Incentives for replacement with X-ray
- Permanent risk and cost reduction
- User benefits
 - Much less security hassle/cost
 - Consistent throughput
 - Potentially additional capabilities



Congressional Support for Permanent Risk Reduction

- The FY19 National Defense Authorization Act sets the goal of eliminating cesium blood irradiators in the US by the end of 2027.
- This is a voluntary effort for owners of blood irradiation devices.
- Our ability to meet the 2027 goal is dependent on continued funding and volunteers.
- The Authorization Act supports the established CIRP incentive structure and process



Interest in Irradiator Replacement is Growing

New York City

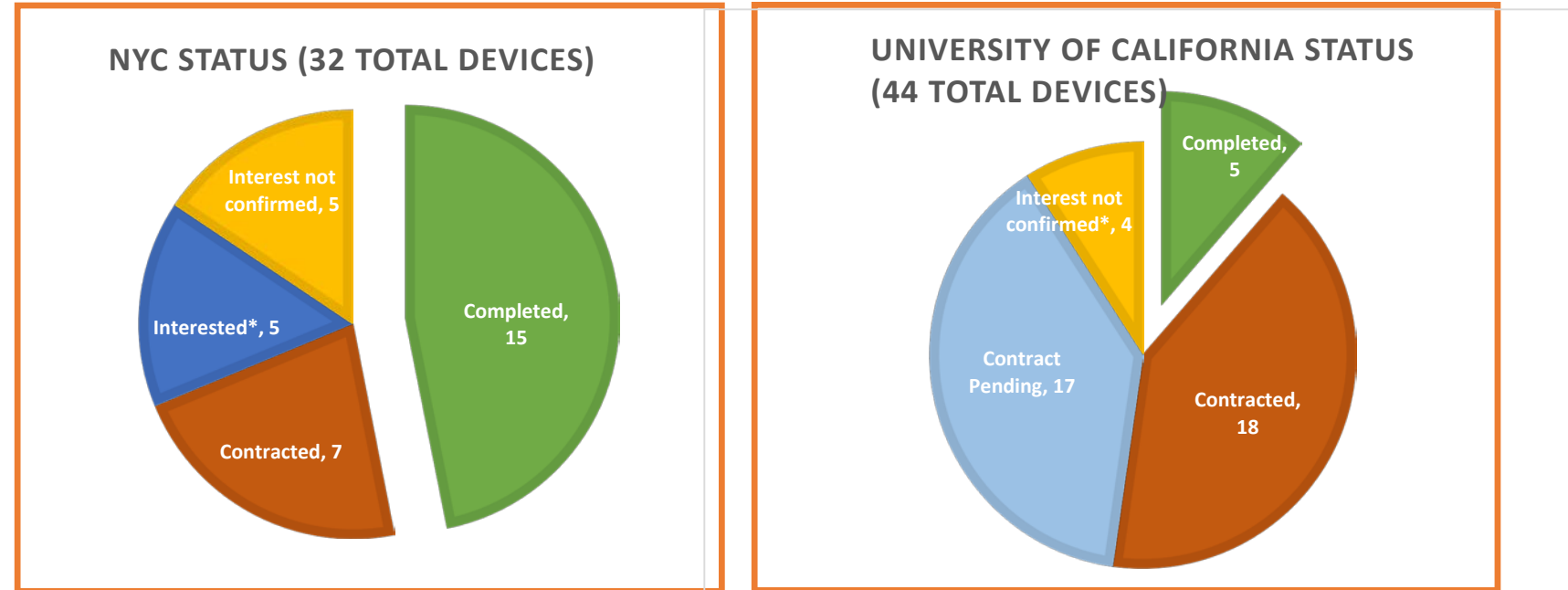
- 75% of irradiators are expected to be replaced/removed
- Partners: NYC regulator, Nuclear Threat Initiative

University of California

- 90% of irradiators are expected to be replaced/removed
- Partners: UC President's office, Nuclear Threat Initiative

Atlanta

- 66% of irradiators are expected to be replaced/removed
- Partners: Emory University, Nuclear Threat Initiative



| CIRP By the Numbers | |
|--|-----|
| Replacements completed | 76 |
| Future replacements contracted or pledged | 112 |
| Percent of US irradiators replaced, contracted, or pledged | 27% |

Global Momentum for Alternative Technologies

ORS also works internationally to promote risk reduction through alternative technologies

- Commercially available and increasing in global distribution
- Technological and operational advancements with “leapfrog” potential
- Integrated with US commitments to the IAEA and radiological security
- Increased global political support

NNSA Accomplishments

- Cs-137 irradiator replacements through the Global Cesium Security Initiative (GCSI)
- NNSA funding for new LINAC and IAEA Dosimetry Laboratory at Seibersdorf, Austria
- NNSA Co-Chair of Ad hoc Alternative Technology Working Group

Ad Hoc Alt Tech Meeting

- 5th Meeting of Ad Hoc Working Group on Alternative Technologies to High Activity Radioactive Sources
- May 23-24 in Vienna, Austria on the margins of the Code of Conduct meeting
- Meeting participants have included regulators, technical experts, and policymakers from over 25 different countries
- **For questions, or to RSVP please contact:**
 - Kristina Hatcher (Kristina.hatcher@nnsa.doe.gov)
 - Renate Czarwinski (czarwinski@me.com)

Options to Support Consideration of Alternative Technologies

Stakeholders

- Operators
- Site Management
- Nuclear Regulator
- Related government agencies – e.g., Health, Agriculture, Environment
- Source disposition experts
- Academic and Civil Society
- Financing Institutions
- International Organizations

Evaluation Questions

- Usage application (e.g., blood irradiation vs. radiotherapy);
- Decision-maker and relevant stakeholders ;
- Commercial and regulatory infrastructure;
- Technical and operational requirements
- Available financial, infrastructure, and human capacity resources

Key Areas for Engagement

- Training and professional development
- Financial Assistance
- Research and technical exchange
- Regulatory or legislative policies



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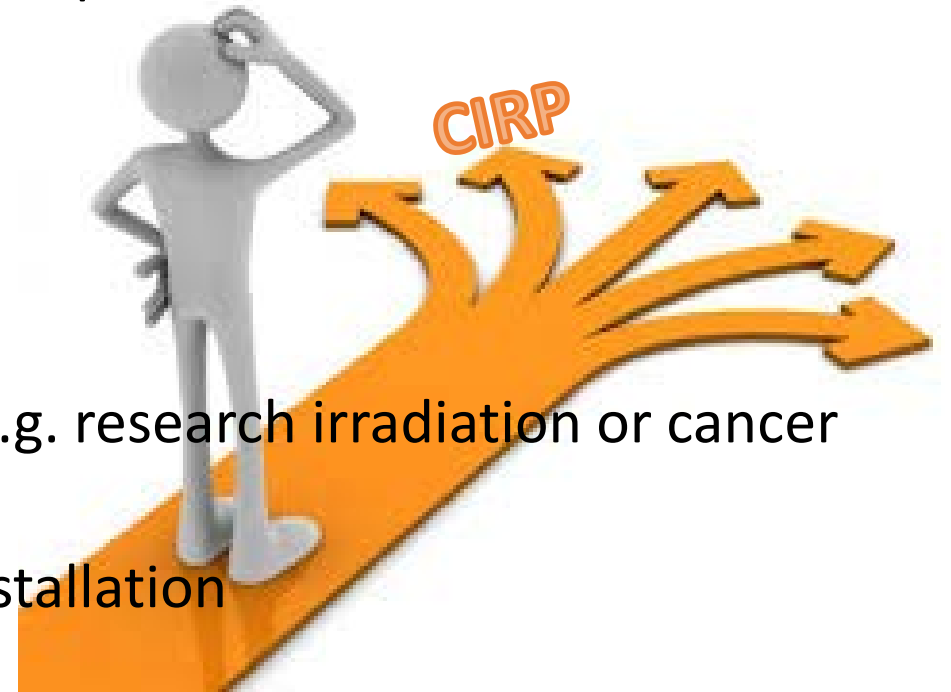
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What are Some Considerations for Replacement?

- **Cost** – device purchase, infrastructure requirements, operating costs, radioactive material disposition
- **Reliability** – operational reliability & maintenance requirements, device throughput & site needs
- **User preference**
- **Information gaps** among users & administrators
- **Research standards & operating protocols**
- **Technology differences for certain applications** (e.g. research irradiation or cancer treatment capabilities)
- **Timeline** – financing, disposition, manufacturer installation



ORS Reduce Mission: Alternative Technologies

ORS Goals

- Increase knowledge that commercially available alternative technologies exist for most applications of high activity radioactive material
- Eliminate the risk that material could be used in a dirty bomb – alternatives do not contain radioactive material
- Provide a sustainable option to lower or manage the burden of disused sources
- Maintain operators' ability to execute important work
- Promote technological advancements and industry innovation

ORS Strategy to Promote Alternative Technologies



Policy Engagement



Device Replacements



Outreach & Education



Research