



# ORS

Office of Radiological Security

*Protect · Remove · Reduce*

## Radiological Risk Reduction through Cesium Irradiator Replacement in the United States

*Aaron Galvan*



Global  
Material  
Security

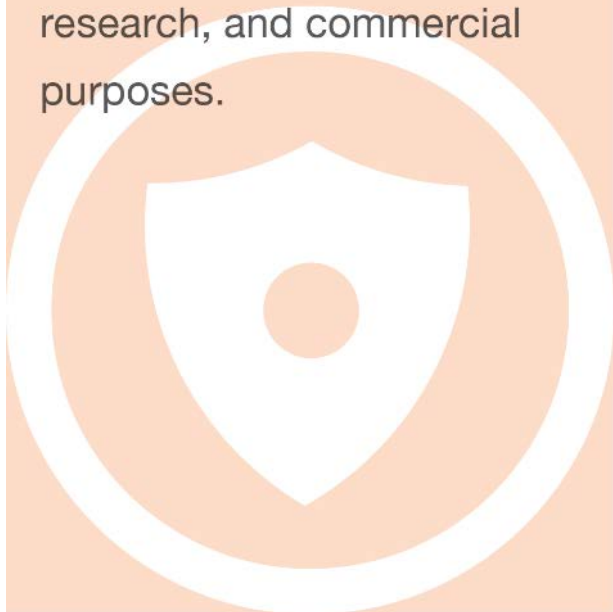


# Office of Radiological Security

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**

Commercially available, non radioisotopic alternatives exist for most major applications of highly radioactive materials.



Application	Typical Isotope	Commercially Available Alternatives?
Blood Irradiation	Cs-137	Yes: X-ray — 3 FDA-approved devices Partial: UV Pathogen Reduction — FDA approval for platelet & plasma systems, ongoing R&D for red blood cell systems
Research Irradiation	Cs-137 Co-60	Partial: X-ray Irradiators for most research applications
External Beam Radiotherapy	Co-60	Yes: Linear Accelerators (LINACs)
Industrial Sterilization	Co-60	Yes: X-Ray, E-beam, LINACs
Well Logging	Am-241 & Cs-137	Incomplete: Am-241 - alternatives available, Cs-137 – ongoing R&D
Radiography	Ir-192	Yes: X-ray





# What is Blood/Research Irradiation?

**Blood** – To prevent Transfusion Associated Graft Versus Host Disease (TA-GVHD) by irradiation of cellular blood products.

**Research** - Irradiators are used to study the effects of radiation on biological samples



- Currently 3 FDA approved X-ray blood irradiators in the U.S.
  - RadSource, Best Theratronics, and Hitachi
- Currently at least 10-20 research irradiator models available with a range of capabilities and prices
- Comparison Study: *Mount Sinai Experience in Migrating from Radioactive Irradiators to X-Ray Irradiators for Blood and Medical Research Applications*



# 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



# Overview of CIRP

Purpose of the program is to gauge interested sites with a Cs-137 device(s) and replace with X-Ray technology.

## Qualified selected sites receive:

- Removal of the Cs-137 device through Off-site Source Recovery Program (OSRP).
- A financial incentive towards the purchase price of an X-ray machine.
  - Payable upon procurement of the X-ray device *and* disposition of the Cs-137 device.

## Qualified selected sites are responsible for:

- Signing an ORS disposition/volunteer statement.
- Identifying which device to procure.
- Purchasing the device.
- Coordinating the device delivery, installation and commissioning.
- Registering their Cs-137 device on the OSRP website.

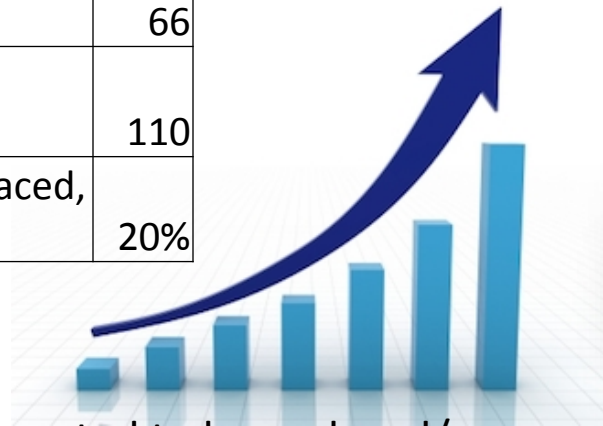
## Reminders

- ORS largely stays out of the device selection process
- **Do not procure an X-Ray device until you are under contract**



# Irradiator Replacement is Trending in the U.S.!

By the Numbers	
Replacements completed	66
Future replacements contracted or pledged	110
Fraction of US irradiators replaced, contracted, or pledged	20%



## 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

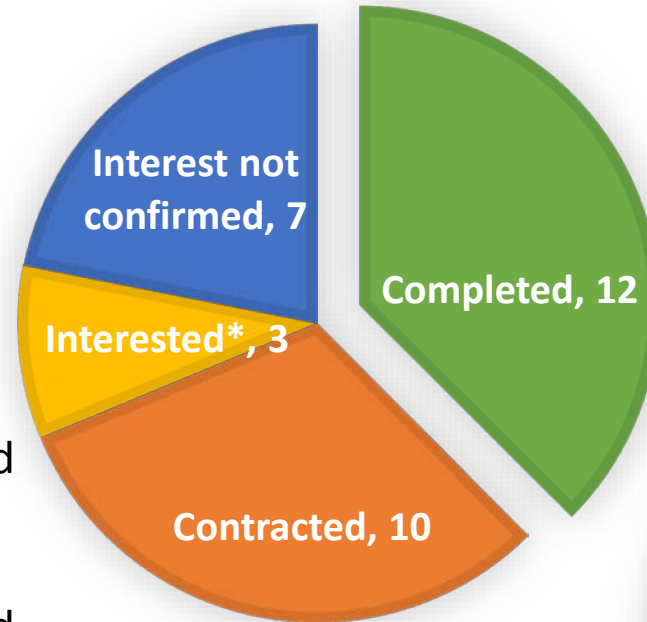
## Atlanta

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

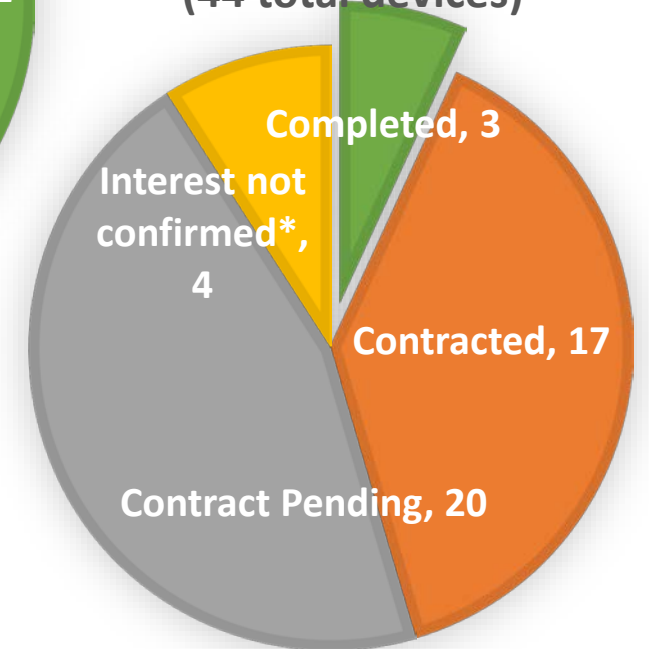
## American Red Cross

- 13 irradiators are expected to be replaced/removed

NYC Status (32 total devices)



University of California Status (44 total devices)



# 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







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