LA-UR 12-27029

Off Site Source Recovery Project

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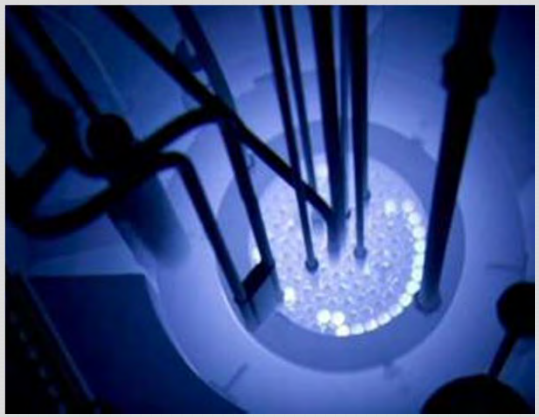
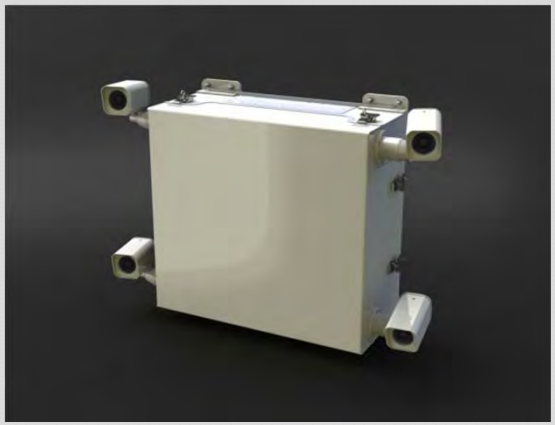
Global Threat Reduction Initiative (GTRI)

- **Mission:** Reduce and protect vulnerable nuclear and radiological material located at civilian sites worldwide
- **Goals:**
  - Convert research reactors and isotope production facilities from HEU to LEU (permanent threat reduction)
  - Remove and dispose of excess nuclear and radiological materials (permanent threat reduction)
  - Protect high priority nuclear and radiological materials from theft and sabotage





Off-Site Source Recovery Project (OSRP)

- Every year, thousands of sources become disused and unwanted in the United States.
- While secure storage is a temporary measure, the longer sources remain disused or unwanted the chances increase that they will become unsecured or abandoned. Thus, permanent disposal is essential.
- To carry out its mission, GTRI/OSRP has the authority to acquire disused sealed sources in the interest of national security or public health and safety.
- OSRP primarily recovers Cs-137, Co-60, Sr-90, Am-241, Pu-238, Pu-239.
  - Every potential recovery is different and must be considered and prioritized. In coordination with the U.S. Nuclear Regulatory Commission (NRC), OSRP has developed a recovery prioritization criteria based on the threat reduction mission. Criteria include activity, isotope, location, and vulnerability.
  - Different Types of Recoveries
    - Transuranics, Low activity (less than 10 Ci) beta/gamma sources without commercial disposal, and High activity beta gamma devices
    - GTRI partners with the Conference of Radiation Control Program Directors, Inc. (CRCPD) on the Source Collection and Threat Reduction (SCATR) project which works with state regulators and licensees to round up sources with commercial disposal pathways

GTRI/OSRP Recoveries

Basic Recovery Steps

Register via GTRI OSRP website osrp.lanl.gov

Outreach to those with registered sources and comprehensive update of database

Review prioritization criteria

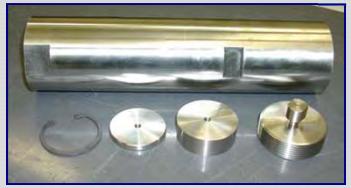
- GTRI, in coordination with NRC, has developed a recovery prioritization criteria based on the threat reduction mission
- Criteria includes activity, isotope, location, vulnerability

Consider logistical options and impediments

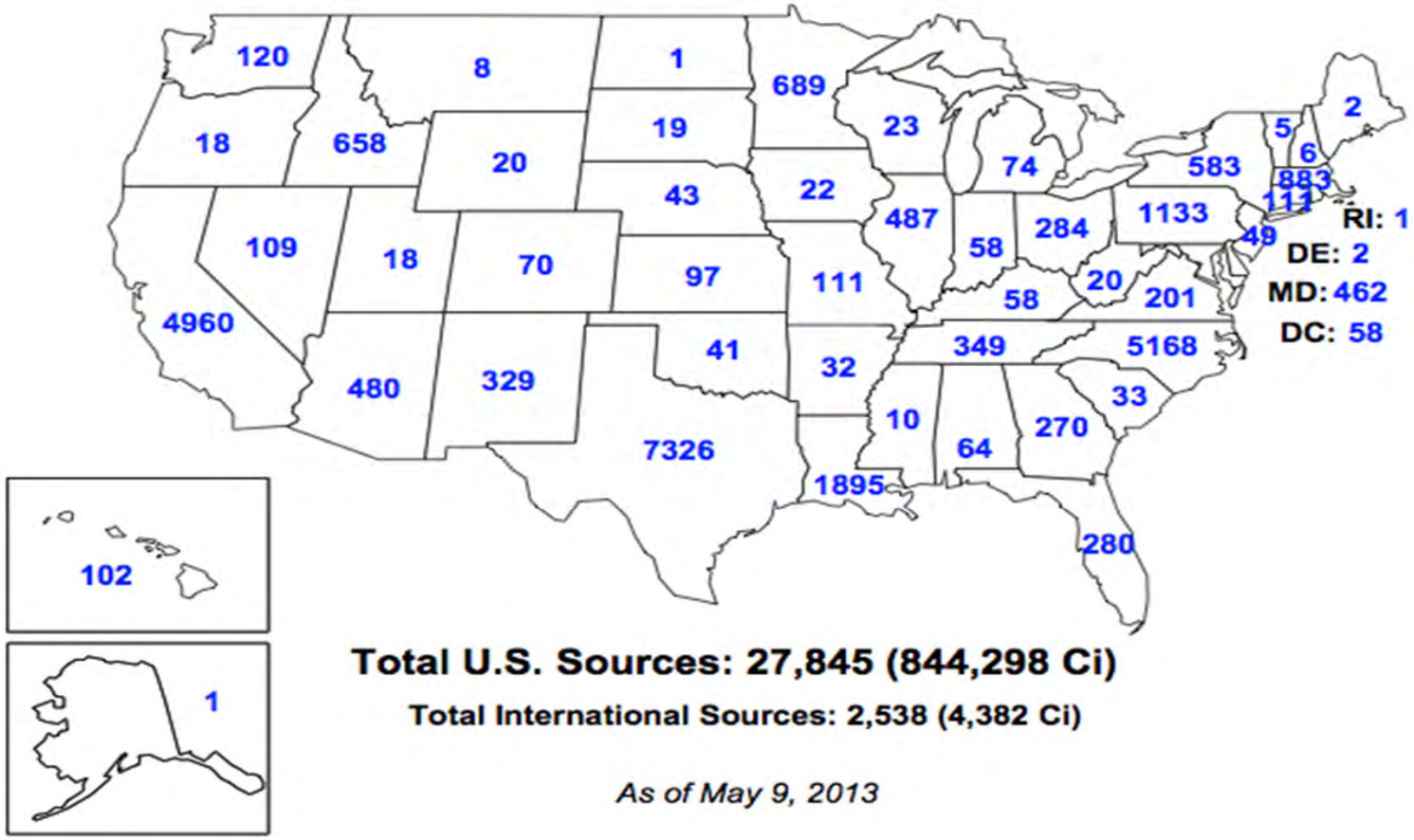
- Availability of transport containers
- Disposal options
- Proximity to sites with scheduled recoveries (round-ups)

Select Best Path Forward

- CRCPD's SCATR Project
- Small beta/gamma without commercial disposal
- Self-ship
- Transuranics
- Large beta/gamma devices



OSRP Sources Recovered



Total U.S. Sources: 27,845 (844,298 Ci)

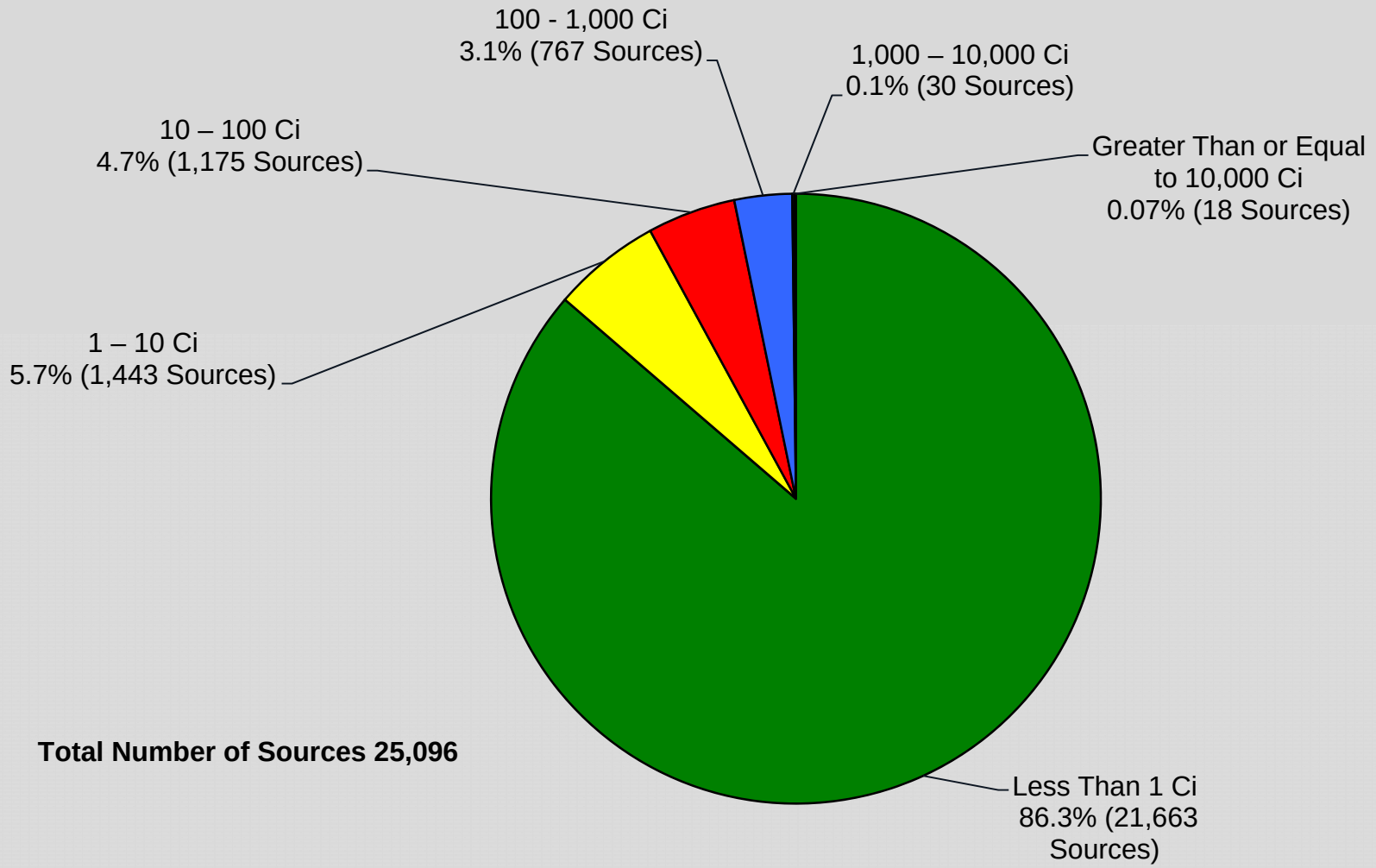
Total International Sources: 2,538 (4,382 Ci)

As of May 9, 2013

GTRI/OSRP International Recoveries

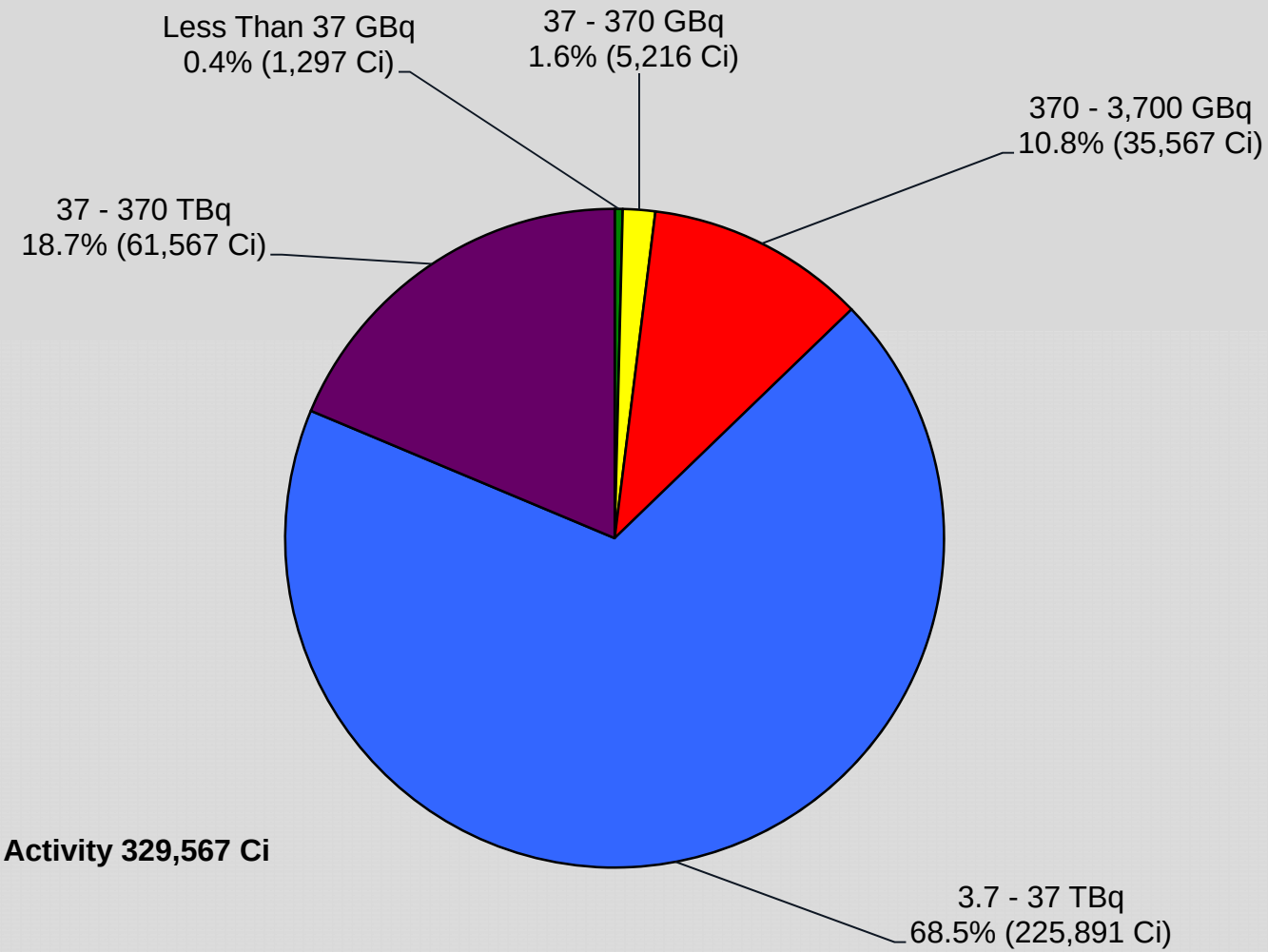
Country	Number of Sources	Total Decayed Activity (Ci)
Argentina	19	36
Australia	210	52
Austria	1	7
Brazil	1000	294
Canada	17	4
Chile	431	22
Denmark	11	44
Ecuador	37	8
France	44	125
Germany	48	14
India	101	289
Israel	7	31
Italy	11	1,202
Japan	1	2
Peru	486	60
Singapore	1	0
South Africa	69	23
Sweden	9	20
Switzerland	5	16
Uruguay	30	2,112
Total	2538	4,362

Sources Registered as Disused and Unwanted on GTRI/OSRP Database



Total Number of Sources 25,096

Decayed Activity of Disused and Unwanted on GTRI/OSRP Database



Total Decayed Activity 329,567 Ci

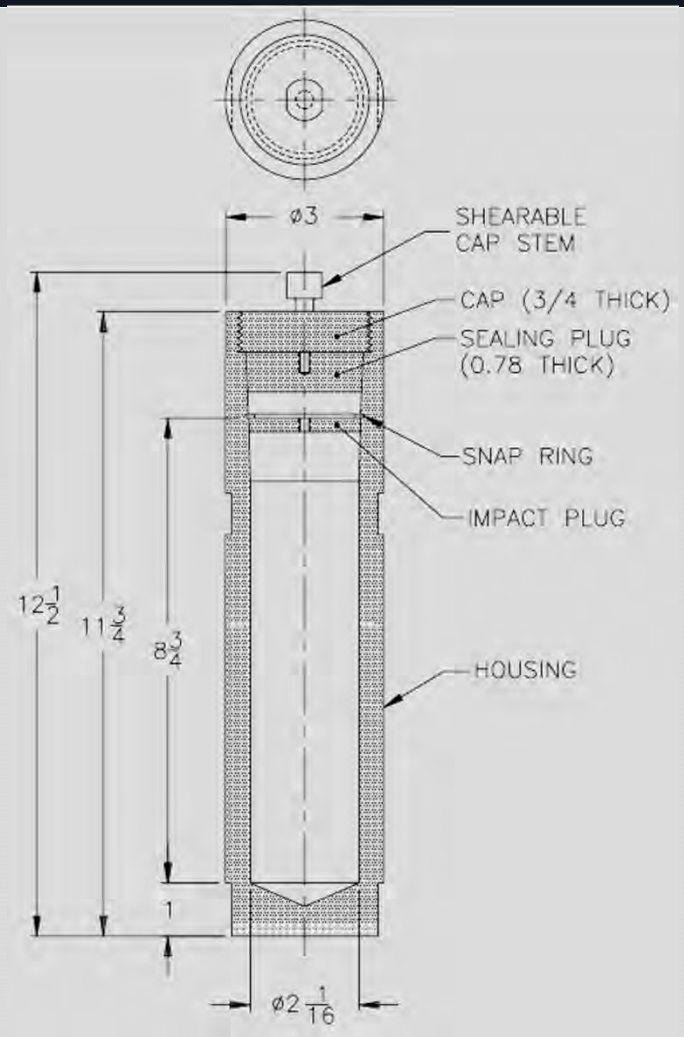
National Security and Disposal

- Radiation Source Protection and Security (RSPS) Task Force
  - Established pursuant to section 651(d) of the Energy Policy Act of 2005 (Public Law 109-58)
    - "[T]o evaluate and provide recommendations to the President and Congress relating to the security of radiation sources in the United States from potential terrorist threats."
  - Includes membership from 14 Federal agencies and 2 State organizations
  - Reports to Congress and the President on progress in sealed source security every four years
    - Next Task Force Report due in 2014
- 2010 Radiation RSPS Task Force Report
  - "By far the most significant challenge identified is access to disposal for disused radioactive sources." (p.iii)
  - "Continued coordinated effort is needed to make sure that comprehensive, sustainable disposal pathways for all disused sealed sources are developed in the interest of national security." (p.iii)
  - "2010 Recommendation 4: The Task Force recommends that the U.S. Government, regional compacts, and States continue to evaluate disposal options for disused radioactive sources, including options for handling a potentially large number of disused cesium chloride sources that may be replaced once viable alternatives are available." (p.37)

Key Sealed Source Disposal Challenges

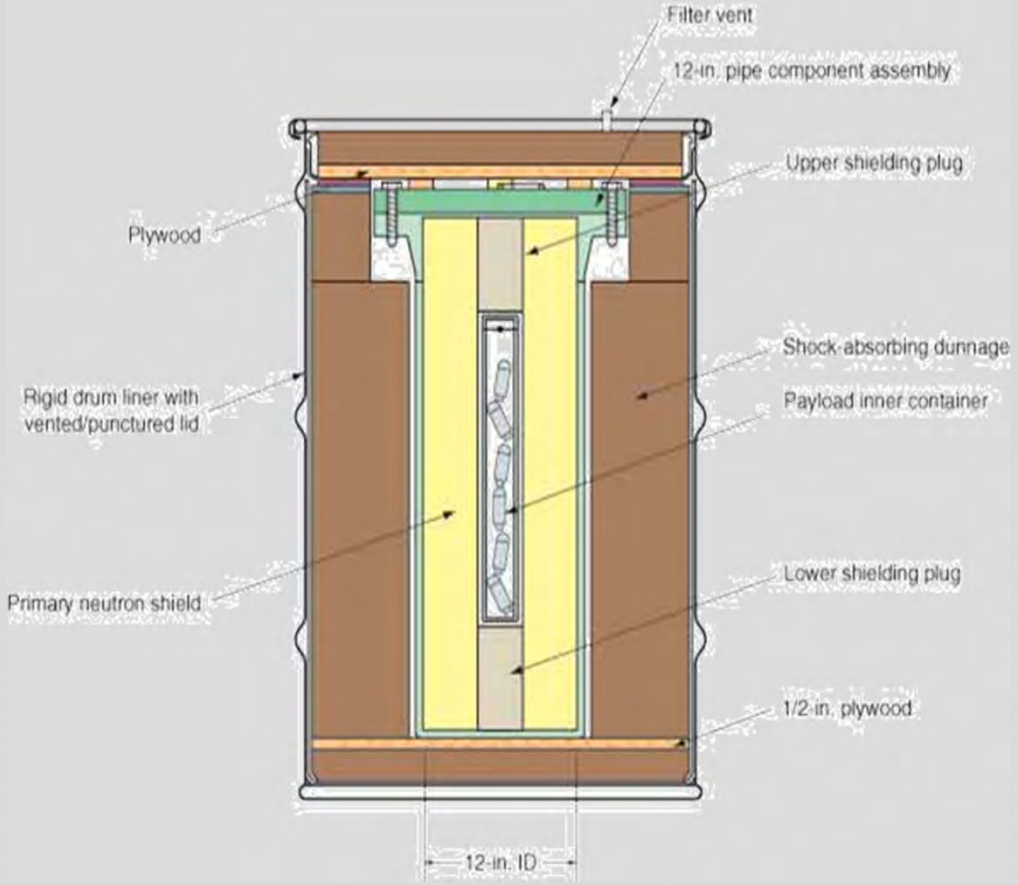
- There are two primary challenges:
  1. Lack of commercial disposal options for high-activity beta/gamma sources (primarily cobalt-60, cesium-137 and strontium-90)
  2. Lack of near-term disposal capability for U.S.-licensed sealed sources containing foreign-origin transuranic source material

LANL Special Form Capsule



- Solves special form problem
- Useful for consolidation
- Useful for storage and disposition
- Solves some safety and security issues
- Allows Type A shipment

Type A(F) Packaging: S300 POC (pipe overpack component)



Questions

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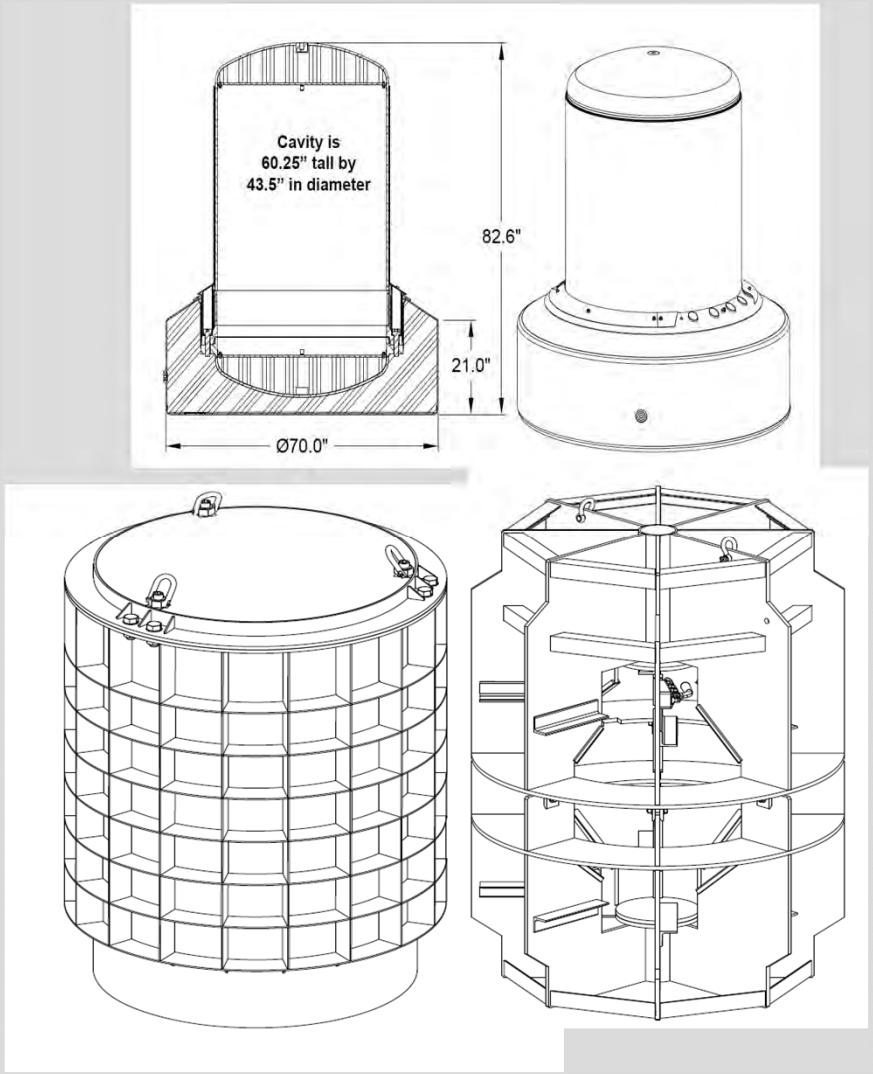
435 B Design

- External construction based on previously certified container
- Design parameters:
  - IAEA Long Term Storage Shield (LTSS) – custom lodgment
  - Shielded devices with Cs-137 or Co-60 – internal container – max weight 1,590 Kg
  - LTSS Cs, Sr, Ir, Se, Ra, Am, Pu and small neutron sources
  - Approximately 480 TBq Co-60, 200 Watts
  - Leak-tight – Normal Condition of Transport (NCT) and Hypothetical Accident Conditions (HAC)
  - Transport by truck, rail, ship, air
  - External dimensions 209 cm Height (H) x 179 cm Outside Diameter (OD)
  - Internal Cavity 152 cm H x 110 cm Inside Diameter (ID)
  - Empty weight 2,225 Kg, total weight 4,535 Kg



435 B Certification

- LTSS
  - No real issues anticipated
  - Extensive modeling
  - 15 different configurations of source loading
  - Review time will be extensive, operational controls more detailed
- Devices
  - NRC concerns – integrity of shielding, as built conditions, effects of long term weathering and unknown abuse, no documents or Quality Assurance
  - Approach – group devices by type – assemble available documentation, dissect devices and verify internal construction
  - Fix source in place for transport
  - Gammator type devices and Gamma Cell 40 irradiators

435 B

380 B Design

- Design parameters:
  - Payload weight 4,535 Kg
  - Co, Cs, Sr, Ir, Ra, Am, Pu, and Depleted Uranium
  - Approximately 275 TBq Co-60
  - Leak tight – Normal Condition of Transport (NCT) and Hypothetical Accident Conditions (HAC)
  - Transport by truck, rail, ship, air
  - External dimensions 330 cm H x 254 cm OD
  - Internal Cavity 162 cm H x 113 cm ID
  - Empty weight 35,835 Kg