Overview

- NRC mission
- Development of security regulatory structure
- Regulatory framework for safety and security
- Integrated Source Management Portfolio
- Radiation Source Protection and Security Task Force
- Events
- Resources
U.S. NRC Mission

• Regulate the Nation’s civilian use of byproduct, source and special nuclear materials
  – Ensure adequate protection of the public health and safety
  – Promote the common defense and security
  – Protect the environment
  – Enable the safe and secure use of radioactive material
Regulatory Development

• Created new 10 CFR Part 37 for physical protection of byproduct material
  – IAEA Category 1 & 2 (aggregated)
  – Irradiated fuel (<100 grams)
• Conforming changes to other regulations
  – Safety, other security regulations
• Started in 2008 – into effect 2013
  – Public meetings
  – 148 comments received
Developing Security and Control Requirements

Threat assessment

Security and control of radioactive materials

Mitigating strategies

Consequences of concern
NRC Source Security Requirements

• Applied in a risk-informed manner
  – Enhanced security requirements apply to licensees of Category 1 and 2 quantities of material (10 CFR Part 37)
  – Security requirements for all categories of material are contained in safety requirements (10 CFR Part 20) and modality-specific regulations (10 CFR Parts 30-36 and 39, as applicable)
<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>IAEA Category 1, 2 and 3 Thresholds</th>
<th>NRC - 10 CFR Part 37 and Parts 20, 30-36, and 39, as appropriate</th>
<th>NRC - 10 CFR Part 20 and Parts 30-36, 39 as appropriate</th>
<th>Cat 3 (and lower, all isotopes)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Cat 1</td>
<td>Cat 2</td>
<td></td>
<td>Cat 3</td>
</tr>
<tr>
<td></td>
<td>TBq</td>
<td>Ci</td>
<td>TBq</td>
<td>Ci</td>
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<tr>
<td>Am-241 (Be)</td>
<td>60</td>
<td>1,600</td>
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<tr>
<td>Cf-252</td>
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<td>540</td>
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<tr>
<td>Cm-244</td>
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<td>0.5</td>
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<tr>
<td>Co-60</td>
<td>30</td>
<td>810</td>
<td>0.3</td>
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<td>Cs-137</td>
<td>100</td>
<td>2,700</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>Gd-153</td>
<td>1,000</td>
<td>27,000</td>
<td>10</td>
<td>270</td>
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<tr>
<td>Ir-192</td>
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<td>2,200</td>
<td>0.8</td>
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</tr>
<tr>
<td>Pm-147</td>
<td>40,000</td>
<td>1,100,000</td>
<td>400</td>
<td>11,000</td>
</tr>
<tr>
<td>Pu-238</td>
<td>60</td>
<td>1,600</td>
<td>0.6</td>
<td>16</td>
</tr>
<tr>
<td>Pu-239 (Be)</td>
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<td>0.6</td>
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<tr>
<td>Ra-226</td>
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<td>Se-75</td>
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<td>Sr-90 (Y-90)</td>
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<td>Tm-170</td>
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<tr>
<td>Yb-169</td>
<td>300</td>
<td>8,100</td>
<td>3</td>
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</tbody>
</table>
Category 1 and 2 Requirements: Administrative

Background Investigations
- Access limited, at all times, to approved individuals
- Trustworthiness and reliability

Documentation
- Security plans
- Transportation records
- List of approved persons

Information Protection
- Access limited to those with a “need to know”
Category 1 and 2 Requirements: Security During Use or Storage

Monitor, Detect, Assess and Respond

- Identify secure zones or radioactive material locations
- Physical security program capable of immediately detecting and assessing unauthorized access
- Immediate response to an actual or attempted theft, sabotage, or diversion
  - Pre-arranged plan with law enforcement for assistance and armed response
  - Contact appropriate regulatory authority (NRC or Agreement States)
## Category 1 and 2 Requirements: Transportation

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Cat 1</th>
<th>Cat 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinate Arrival Time and Confirm Receipt</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Continuous and Active Monitoring of Shipment</td>
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<td>✔</td>
</tr>
<tr>
<td>Communication Center/Call-In, Backup Communication</td>
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<td>✔</td>
</tr>
<tr>
<td>Package Tracking Systems</td>
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</tr>
<tr>
<td>Capability to Summon En-Route Assistance</td>
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<td>✔</td>
</tr>
<tr>
<td>Plan and Coordinate Shipment with En-Route States</td>
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<td>✔</td>
</tr>
<tr>
<td>Advance Notification to NRC and En-Route States</td>
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</tr>
<tr>
<td>Investigation of Past Due Shipments</td>
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<td>✔</td>
</tr>
<tr>
<td>Report Lost, Missing or Stolen Material</td>
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<td>✔</td>
</tr>
<tr>
<td>Notify Law Enforcement and NRC</td>
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<td>✔</td>
</tr>
<tr>
<td>Accompanying Individual/No Casual Stops/Surveillance</td>
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<td>✔</td>
</tr>
<tr>
<td>Training, Procedures and Instructions</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Category 1-5 Requirements

• All radioactive material – even very small activities - have security requirements embedded within the safety requirements

10 CFR Part 20 – Standards for Protection Against Radiation

§ 20.1801 Security of stored material:
“…secure from unauthorized removal or access…”

§ 20.1802 Control of material not in storage:
“…control and maintain constant surveillance…”
Category 1-5 Requirements

- Specific uses (modalities) of radioactive material have additional requirements (10 CFR)
  - Part 30: General license requirements for byproduct radioactive material
  - Part 32: Manufacture and/or distribute radioactive material
  - Part 33: Broad scope users
    - Academic institutions; medical facilities
  - Part 34: Industrial radiography
    - Construction integrity; pipeline integrity
  - Part 35: Medical uses
  - Part 36: Panoramic irradiators
    - Medical equipment; cosmetics
  - Part 39: Well logging for oil and gas exploration
Integrated Source Management Portfolio

• Regulations and security requirements are in place, but an information technology component is needed to ensure the safety and security of nation’s radioactive materials

• ISMP comprised of three modules
  • National Source Tracking System (NSTS)
  • License Verification System (LVS)
  • Web-Based Licensing (WBL)

• Provides a web-based solution to:
  • enable accounting of the most risk-significant radioactive sources in the nation
  • authenticate license validity
  • modernize materials licensing
10 CFR 20.2207 states that each licensee who manufactures, transfers, receives, disassembles, or disposes of a nationally tracked source must complete and submit a National Source Tracking Transaction Report.
Nationally Tracked Sources are
- Category 1 and 2 sources
- Actinium-227, Thorium-228 & Thorium-229 sources >20 TBq (540 Ci)
- Polonium-210 sources > 60 TBq (1,600Ci)

National Source Tracking System (NSTS)
- > 1,000 transactions every week
- 97% of transactions involve 3% of the sources, Ir-192, Co-60 & Cs-137
– Provides a license maintenance system
– Contains an up-to-date repository of all risk-significant (Category 1 and 2) licenses nationwide
– Contains all licenses for NRC and certain Agreement States that have chosen to adopt the system for use or submit licenses voluntarily
– Tracks all licensing actions, inspections, enforcement history
• Enables the validation and accuracy of Category 1 and Category 2 materials licenses
• Verification before unauthorized parties purchase radioactive materials
• Enables verification that Category 1 and Category 2 possession limits are not exceeded
Radiation Source Protection and Security Task Force

http://www.nrc.gov/security/byproduct/task-force.html

1) Radiation sources that should be secured
2) National system for recovery of lost or stolen radiation sources
3) Storage of radiation sources
4) National tracking system for radiation sources
5) National system for proper disposal of radiation sources
6) Export/Import controls on radiation sources
7) Security and control of radiation sources
8) Transportation security of radiation sources
9) Background checks for those with access to radiation sources
10) Alternative technologies
Evaluation of Reported Events Involving Radiological Material

From October 2005 to March 2016

• No losses or thefts of Category 1 material
• 34 reported events involving Category 2 material
  – 33 events: material recovered intact
  – 1 event: material not recovered
    • radiography device stolen from a vehicle (a violation of security requirements)
• 37 reported events involving Category 3 material
  – 34 events: material recovered intact
  – 3 events: material not recovered
    • 2 events: source within cardiac pacemaker buried with deceased patient
    • 1 event: radiography device dropped from oil platform into Gulf of Mexico

Totals in the United States

• ~20,800 Category 1-5 licensees nationwide
• ~77,000 Category 1 and 2 sources
• ~7,500 – 10,000 transactions/month
• ~25,000 Category 3 sources
• ~2 million devices
• Over 20 million medical procedures/year
NRC National Materials Program
- Available Resources

• NRC website http://www.nrc.gov/

• NRC Radioactive material security website http://www.nrc.gov/security/byproduct.html


NRC National Materials Program
- Part 37 Available Resources

• Limited access website which shares suspicious event information with licensees


THANK YOU FOR YOUR ATTENTION