The global nuclear safety regime to control and manage inadvertent radioactive material in scrap metal

Didier LOUVAT
The present situation

Number of Scrap Metal Events

<table>
<thead>
<tr>
<th>Year</th>
<th>No. (scrap metal)</th>
<th>No. (IEC actions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>2007</td>
<td>51</td>
<td>7</td>
</tr>
<tr>
<td>2008</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Event</td>
<td>Rating</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Chernobyl (1986)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Kyshtym (1957)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Windscale (1957)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Goiania (1987)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Three mile island (1979)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Tokaimura (1999)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Vandellos (1989)</td>
<td>3</td>
<td></td>
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<tr>
<td>Industrial radiographer worker overexposure</td>
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</table>
Decommissioning evolution over time
The Nuclear Safety Regime applied to Radioactive Waste Management

The Joint Convention

International Safety Standards

National Policy and Strategy

The CoC

National Regulatory Control
The Joint Convention

- The first legal instrument to address on a global scale safety issues concerning the management of spent fuel and radioactive waste.
- Its scope concerns not only those States with major nuclear power programmes but also those that use radiation sources only in medicine and industry.
Code of Conduct on the Safety and Security of Radioactive Sources

Non-binding international instrument based on International Standards

Provides recommendations to States on:

- Legislation
- Regulations
- Regulatory body
- Import/export controls
Political support - June 2006

Code of Conduct: 83 States have provided written political support

Guidance: 30 States have made the additional political commitment for its harmonised implementation
The IAEA Safety Standards

- The safety standards series comprises three levels of documents:
  - Safety Fundamentals
  - Safety Requirements
  - Safety Guides

- Cf. Supporting documents
  - Safety Reports
  - Technical Reports
  - TECDOCs
Fundamental Safety Principles

1 Responsibility for safety
2 Role of government
3 Leadership and management for safety
4 Justification of facilities and activities
5 Optimisation of protection
6 Limitation of risks to individuals
7 Protection of present and future generations
8 Prevention of accidents
9 Emergency preparedness and response
10 Protective actions to reduce the existing on unregulated risks
The International Basic Safety Standards

- Cosponsored by FAO, IAEA, ILO, OECD/NEA, PAHO, WHO
- General requirements for protection against exposures to both natural and artificial radionuclides
- Covers practices and interventions
The new classification application to DSRS and NORM

<table>
<thead>
<tr>
<th>WASTE TYPE</th>
<th>HALF LIFE</th>
<th>ACTIVITY</th>
<th>VOLUME</th>
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<tbody>
<tr>
<td>i</td>
<td>&lt;100d</td>
<td>100 MBq</td>
<td>Small</td>
</tr>
<tr>
<td>ii</td>
<td></td>
<td>5 TBq</td>
<td>Small</td>
</tr>
<tr>
<td>iii</td>
<td>&lt; 15 y</td>
<td>&lt; 10 MBq</td>
<td>Small</td>
</tr>
<tr>
<td>iv</td>
<td></td>
<td>&lt; 100 TBq</td>
<td>Small</td>
</tr>
<tr>
<td>v</td>
<td>&lt; 30 y</td>
<td>&lt; MBq</td>
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<td>vi</td>
<td></td>
<td>&lt; PBq</td>
<td>Small</td>
</tr>
<tr>
<td>vii</td>
<td>&gt; 30 y</td>
<td>&lt; 40 MBq</td>
<td>Small, but may be large numbers</td>
</tr>
<tr>
<td>viii</td>
<td></td>
<td>&lt; 10 GBq</td>
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</tbody>
</table>

Illustrative example for the application of the waste classification scheme.
Safety Guide RS-G-1.7
Exclusion, exemption, clearance

• Applies to both natural and artificial radionuclides

• Activity concentrations in materials for defining the scope of regulatory control including clearance of materials
Safety Standards for Predisposal

IAEA Safety Standards for protecting people and the environment

Predisposal Management of Radioactive Waste

Safety Requirements
No. GSR 5

Storage of Radioactive Waste

Safety Guide
No. WS-G-2.9
Requirements for Disposal

IAEA SAFETY STANDARDS SERIES

Near Surface Disposal of Radioactive Waste

IAEA Safety Standards for protecting people and the environment

Geological Disposal of Radioactive Waste

Safety Requirements
No. WS-R-4

IAEA

Disposal of Radioactive Waste

Safety Requirements
DS 354

IAEA

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Safety Guide on orphan sources and contaminated material in the metal recycling industry

**SCRAP METAL**

**ORPHAN SOURCES**
- Abandoned
- Lost
- Stolen
- misplaced

**CONTAMINATED METAL**
- Decommissioning NORM from industries

**RECYCLING**
- Scrap yard, segregation, shredding, melting, product finishing

**Clean product**

**Investigation, return, waste management**

**Orphan sources**

**Contaminated metal**

**Contaminated products**

**Contaminated by-products**

IAEA
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Conclusions

- Problems recognized
- Metal recycling facilities sensitized
- Elements of the global nuclear safety regime in place to control and manage inadvertent radioactive material in scrap metal
- Need for better application at the national/regional level
- Bridge between decommissioning industry and steel industry to enlarge