### Cs-137

- **Half Life:** 30.17 years
- **Radiation:** Decay Mode: Beta
- **Gamma Constant:** 4.24 mR/hr per 1 mCi at 30 cm

#### Major Betas:

<table>
<thead>
<tr>
<th>Max E(MeV)</th>
<th>Avg E (MeV)</th>
<th># per 100 dis</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.512</td>
<td>0.157</td>
<td>95</td>
</tr>
<tr>
<td>1.173</td>
<td>0.415</td>
<td>5</td>
</tr>
</tbody>
</table>

- Max. Beta Range in Air: 130 cm
- Max. Beta Range in Water: 1.5 cm

#### Major Gammas:

<table>
<thead>
<tr>
<th>E(MeV)</th>
<th># per 100 Dis</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.662</td>
<td>90</td>
</tr>
</tbody>
</table>

Average gamma E = 0.662 MeV

#### Intake Data (annual):
- **Minimum Ingestion:** 100 µCi equals 5 rem TEDE (WHOLE BODY)
- **Minimum Inhalation:** 200 µCi equals 5 rem TEDE (WHOLE BODY)

#### Doses:
- **Skin Dose:** Reported for 1 µCi over 10 cm² of skin
- N/A mrad/hr (gamma dose)
- **Point Source:** 511 mrad/hr (beta dose)
- **Disk Source:** 513 mrad/hr (beta dose)

#### Shielding Information:

- **Maximum Range For Beta**
  - Plastic: 0.53 cm
  - Aluminum: 0.25 cm

- **Tenth Value Thickness For Average Gamma:**
  - Concrete: 13 cm
  - Lead: 1.7 cm

#### Detection information:
- Usable Detectors listed with estimate efficiencies
  - Ludlum 3 w/ pancake probe at 1 cm: 7% Liq. Scint. Counter 90%
  - Ludlum 3 w/ NaI probe near surface: 4% Gamma Counter 30%

#### Action Quantities:

- Bench Top Quantity Must Be Less Than 1000 µCi
- Containers Require Labeling When Greater Than 10 µCi
- Rooms Require Posting When There Is Greater Than 100 µCi
- Contamination Lasting More than 24 hrs Require NRC Notification At 500 µCi