# RADIONUCLIDE DATA SHEET
# Cesium – 137

**Cs – 137** 55 protons 82 neutrons

***Radiation:*** **Decay mode:** Beta to Ba-137m

**Major Betas:**

| Max E (MeV) | Avg E (MeV) | # per 100 dis |
|---|---|---|
| 0.512 | 0.157 | 95 |
| 1.173 | 0.415 | 5 |
| | | |

Max. Beta Range in air 1300 cm or 42.7 ft
Max. Beta Range in water 1.5 cm

**Major Gammas:**

| E (MeV) | # per 100 dis |
|---|---|
| 0.662 | 90 |
| | (Ba-137) |
| | |

**Avg. gamma E** = 0.662 MeV

***Half – life:*** 30.17 years or 1.1E+04 days

***Gamma constant:*** 4.24 mR/hr per 1 mCi at 30 cm

***Radiological data:***

**Min. Ingestion ALI:** 100 μCi equals 5 rem TEDE (Whole Body)
**Min. Inhalation ALI:** 200 μCi equals 5 rem TEDE (Whole Body)

***Doses:***

**Skin Dose:** Reported for 1 μCi over 10 $cm^2$ of skin
? mrad/hr (gamma dose)
**Point Source:** 511 mrad/hr (beta dose)
**Disk Source:** 513 mrad/hr (beta dose)

***Shielding data:***

| | | | |
|---|---|---|---|
| **Max. 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 estimated efficiencies
(Use efficiencies listed on instrument when available)

| | | | |
|---|---|---|---|
| **Ludlum 3 with pancake probe at 1 cm:** | 7 % | **Liq. Scint. Counter:** | 90 % |
| **Ludlum 3 with 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 when greater than** | 500 μCi |

Updated – 08/02/2005