### RADIONUCLIDE SAFETY DATA SHEET

**RADIONUCLIDE:** Ba-133  
**FORMS:** Soluble

#### PHYSICAL CHARACTERISTICS

**HALF-LIFE:** 10.52 years

#### DECAY EMISSIONS

<table>
<thead>
<tr>
<th>Emission Type</th>
<th>E (keV)</th>
<th>%</th>
<th>E (keV, Ave)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gammas / X-rays</td>
<td>31</td>
<td>99</td>
<td>45*</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>356</td>
<td>62</td>
<td>17*</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>81</td>
<td>34</td>
<td>25*</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>303</td>
<td>18</td>
<td>75*</td>
<td>6</td>
</tr>
</tbody>
</table>

- Only 4 most probable emissions per decay type included. Emissions below 10 keV or 1% excluded.

#### STANFORD HAZARD CATEGORY

- **C** – level (low hazard): \( \leq 20 \) mCi
- **B** – level (moderate hazard): \( > 20 \) mCi, \( \leq 1 \) Ci
- **A** – level (high hazard): \( > 1 \) Ci

#### EXTERNAL RADIATION HAZARDS

- **Gamma dose rate, point source at 1 ft, 1 mCi:** 2.54 mrem/h
- **Beta dose rate to skin, point source at 1 ft, 1 mCi:** 10 mrem/h
- **Contamination skin dose, uniform deposit of 1 \( \mu \)Ci per cm\(^2\):** 480 mrem/h

#### SHIELDING

- **Gammas/X-rays:** 5.65 mm of lead will reduce the gamma dose rate by 90%.
- **Betas/electrons:** 0.7 mm of plastic will absorb all emissions. Bremsstrahlung may be created and require additional shielding.

#### DOSIMETRY AND BIOASSAY REQS

- Whole-body and finger-ring dosimeters are required for handling 5 mCi or more, or 1 mCi amounts weekly. Urine assays may be required after large spills or contaminations.

#### SPECIAL PROBLEMS AND PRECAUTIONS:

1. Recommended survey probe: NaI
2. Always wear protective gloves, a lab coat, and safety eyewear to protect the skin and eyes from contamination. Change gloves often.
3. Survey work areas before, during, and after work. Work areas may require shielding to keep dose ALARA. Instrument and smear surveys are required.
4. Segregate waste to those with half-lives of greater than 120 days (excluding H3 and/or C14). Survey the waste disposal area to ensure exposure rates are less than 2 mR/hr at 1 foot.
5. Limit soluble waste to the sewer to less than 100 \( \mu \)Ci/day per lab.

#### References: