Iodine 125-I (125 I) safety information and specific handling precautions

125 I is considered toxic because of its affinity for the thyroid gland. Accordingly, allowable air and water concentrations are extremely low, making it extremely important that the release of radioiodine in the laboratory be controlled. Unbound radioiodine is extremely volatile and must be handled appropriately. Radioiodine is biologically active, and up to 30% of any activity ingested may concentrate in the thyroid gland. The maximum permissible levels of contamination in non-ventilated areas are well below the detection limit for a typical Geiger counter. Therefore, a thin crystal sodium iodide detector is recommended. Average efficiency for detecting 125 I with a sodium iodide probe is approximately 30%. 125 I decays with a half-life of 60 days. It emits soft gamma radiation and x-rays with a maximum energy of about 35 KeV; also emitted are conversion and auger electrons with a maximum energy of about 35 KeV. Radioiodine metabolized by the thyroid gland has an effective half-life in the thyroid gland of about six weeks.

Physical Data:

Maximum gamma radiation energy: 35 KeV
Maximum range in air: N/A
Radiological half-life: 60 days
Internal Occupational Limits:
Annual Limits on Intake:
Inhalation: .06 mCi
Ingestion: .04 mCi

Precautions:

1. Follow General Safety Precautions for all isotopes.

2. Use forceps fitted with rubber sleeves to ensure a secure grip on containers.

3. Radiation badges should be worn by all personnel involved in performing iodinations.

4. Radiation Safety approved hoods must always be used when performing iodinations.

5. Never remove the rubber vial septum on containers of volatile iodine! Remove all Na 125 I aliquots with Hamilton® hypodermic syringes inserted through the vial's rubber septum. The stock vial containing Na 125 I should be purged with a charcoal trap before beginning the experiment. The Radiation Safety Section can supply you with charcoal traps.

6. If the iodination procedure requires a vacuum withdrawal of supernate or other substance containing iodine, an iodine trap should be placed between the collection flask and the vacuum source in order to protect the house vacuum line from contamination.

7. Store Na 125 I solutions at room temperature in a approved hood, do not freeze and avoiding heat Na 125 I solutions as this will result in subsequent volatilization.

8. Maintain a pH greater than 7 in Na 125 I solutions in order to reduce volatilization.

9. Have reducing agents available when using Na 125 I.

10. In the event of a spill involving volatile Na 125 I hold your breath and vacate the iodination area closing the doors behind you. Do not permit anyone to enter the spill area and contact the Radiation Safety Section immediately.

11. More information pertaining to thyroid counts may be obtained by calling 737-2139 or 785-4250. Thyroid counts are scheduled as required and performed in BCMM B-01.

^{125}I LAB INFO SHEET

^{125}I Iodine

Low Energy Gamma Emitter
Half-Life: 60 days
Max energy: 35KeV (at 100%)
ALI: .06 mCi via inhalation
.04 mCi via ingestion
Critical Organ: Thyroid
Bioassay: Thyroid count

Detection:
Meter w/ NaI Probe
Gamma Counter, LSC



LSC

Gamma Counter


Shielding: Lead

PPE: Double gloves,
Lab coat, Safety glasses

Dosimetry: Film Badge or TLD


Notes and Special Precautions

- **Personal surveys are vital.**
- **Use NaI probe for direct survey. NaI probes are very sensitive. Note: Bkg ~ 300cpm —GM Probes are NOT efficient ~ only at .07%.**
- **Wear double gloves and change gloves often.**
- **Toxic due to affinity for thyroid gland.**
- **Lead shielding and badges for mCi quantities.**
- **Careful of following issues which can increase volatility;**
  - **Do not freeze ^{125}I,**
  - **Keep pH of iodine materials basic,**
  - **Do not use bleach to deactivate waste, use iodine based disinfectant instead.**

Precautions specific to use 1) RIA Kit users and 2) Free Iodinations

- **RIA Kit users –dosimetry is NOT required, low amounts to work with (µCi) Work can be done on benchtop. Shielding liquid waste is recommended.**
- **Iodinations require more controls because unbound Iodine (NaI) is volatile (Air Sampling required) Approved iodination hoods required (BCMM Lab) for iodinations.**
  - **Thyroid counts required for iodinators (Done in BCMM B01).**
  - **Baseline and then within 6-72 hours post each iodination.**
  - **Call 785-4250 for EHS iodination scheduling.**

Class III Waste ≥ 60 days ≤120 days

EMERGENCY SPILLS or SKIN CONTAMINATION

203-785-3555

Yale *Environmental Health & Safety 203-785-3550*

ALARA: Time—Distance—Shielding.

NO EATING, DRINKING, OR SMOKING in lab.