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Subject: LEAKING IRRADIATOR SOURCE DETERMINATION		Section/Number/Revision 9.205 . A
		Effective Date: 10/01/86
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## 1.0 PURPOSE

To establish a method for isolating a leaking irradiator source.

## 2.0 SCOPE

All irradiator operators at Radiation Technology, Inc. (RTI) or Process Technology, Inc. (PTI) subsidiaries.

## 3.0 REFERENCES

None

## 4.0 DEFINITIONS

None

## 5.0 EQUIPMENT/MATERIAL REQUIREMENTS

### 5.1 Spill kit

- 5.1.1 (50 ft) clear polyethylene tubing
- 5.1.2 Rollflex pump
- 5.1.3 Stainless steel closure
- 5.1.4 Calibrated low range radiation survey instrument
- 5.1.5 (50) 250 ml. sample bottles
- 5.1.6 Standard source handling tools
- 5.1.7 Anti-contamination materials
- 5.1.8 Source handling table
- 5.1.9 Personnel dosimeters
- 5.1.10 Self Reading pocket dosimeters

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## 6.0 SAFETY REQUIREMENTS

- 6.1 Operations shall be conducted under the direction of the Radiation Safety Officer (RSO) or his designated alternate.
- 6.2 General rules of radiation safety shall apply.
- 6.3 All operations shall be conducted with the sources located at a depth of greater than 10 feet in the pool.
- 6.4 The demineralizer should be secured and the transport tube cover between the main pool and the Research and Development (R&D) pool should be closed.

## 7.0 PROCEDURE

- 7.1 If the activity of the pool water or the radiation level on the charcoal filter indicates the presence of Co60, the following actions should be taken to identify and isolate the leaking source.
  - 7.1.1 Locate sampling test equipment listed in Section 5.0 and establish applicable radiological controls.
  - 7.1.2 Connect the suction end of the tubing to a standard source handling tool and lower it into the pool as far as possible from the source.
  - 7.1.3 Place the discharge end of tubing into the pool near the source and secure.
  - 7.1.4 Start the pump and establish flow through the tubing.
  - 7.1.5 Place the detector of a low range survey instrument adjacent to the tubing.
  - 7.1.6 Establish a background radiation level.

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## 7.0 PROCEDURE (cont)

7.1.7 Move the suction end of the tubing directly adjacent to the source in the first module and monitor the survey instrument for an increase in reading. Allow sufficient time for sample transit before moving on to the next sample location.

NOTE: If a source has obviously been damaged due to an accident or equipment failure, the source or sources that have visual damage should be tested first. If the leaking source is not apparent due to damage, then sampling tests will be required to determine the location of the leaking source. Sampling tests shall be conducted in a uniform manner such that the test begins in one source module and progresses through the entire source plaque.

7.1.8 If a noticeable increase in radiation level is determined in the area of a module, remove the module from the plaque and place the module on the source handling table.

7.1.9 Move the tubing to the source handling table and repeat the sampling.

NOTE: This will verify that the leaking module has been removed.

7.1.10 Remove the sources one at a time from the leaking module, and sample test each to determine the leaking source.

7.1.11 Place the leaking source into a stainless steel enclosure in preparation for disposal or repair.

7.2 If the source leakage rate is too low to allow detection using the above procedure, use the following alternate method.

7.2.1 Draw a 250 milliliter sample at the pump discharge.



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## 7.0 PROCEDURE (cont)

7.2.2 Count the sample using the standard liquid sampling techniques.

7.3 If the alternate method of detection does not prove effective due to a very low leakage rate:

7.3.1 Place each source into the stainless steel enclosure for 8 hours.

7.3.2 Sample the water from the enclosure.

7.3.3 Perform a radioactivity analysis of the water sample.

7.3.4 Continue this process until the leaking source is isolated.

7.3.5 Place the leaking source into a stainless steel enclosure.

7.3.6 Ship off site for repair or disposal per RTI procedure 9.401.

## 8.0 EXHIBITS

None