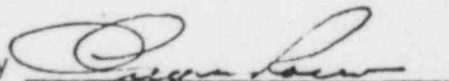


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Procedure No. T-15

2802

# GENERAL USE OF THE Cs-137 GAMMA CALIBRATOR

Approved by

  
Fred G. Rocco  
Vice President, Technical  
Services

1-5-79  
Date

  
Initials

## REVISIONS

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## GENERAL USE OF THE Cs-137 GAMMA CALIBRATOR

### 1.0 PURPOSE

The purpose of this procedure is to provide instruction for safe and proper operation of the 130 Curie Cs-137 gamma irradiation source.

### 2.0 SCOPE

This procedure describes general utilization of the 130 Curie Cs-137 gamma irradiation source and is not meant to describe usage for any particular purpose.

### 3.0 DEFINITIONS

As used in this procedure:

- 3.1 "Attenuator" means the devices used to reduce the radiation beam intensity to convenient levels as necessary. For convenience, each attenuator is denoted by its nominal reduction factor (e.g., the X 100 attenuator refers to that attenuator which reduces the intensity of the radiation beam by a factor of approximately 100).  
NOTE: The actual value of each attenuator is a known value.

### 4.0 REFERENCES

- 4.1 Operating manual for Series 28 Calibration facilities, J. L. Sheppard and Associates.
- 4.2 Radiation Protection procedures (RMC procedure R-9).
- 4.3 Exposure rate data for Series 28, serial number 603 irradiator. This is a table of source output versus distance from source and attenuator used.

### 5.0 SAFETY PRECAUTIONS

- 5.1 Wear assigned personal monitoring device when entering the room containing the irradiator.
- 5.2 When the source is exposed no individual shall cross the imaginary vertical plane that marks the area irradiated by the source. An infrared light beam with a photoelectric source interlock is considered to be the boundary of the area irradiated by the source.
- 5.3 Observe applicable radiation safety regulations as described in reference 4.2.
- 5.4 The gamma survey instrument can be used to verify that the source is inside the source housing.
- 5.5 Individuals using this source must be an authorized user. An authorized user must be familiar with this procedure and procedure R-9 (Radiation Protection Procedures) and also must have the

approval of the Radiation Safety Office. Authorized source users are to be listed on "RMC Authorized Source User and Approval Form".

- 5.6 Keys to the source are to be kept in a permanent location that is not readily accessible by anyone who is not an authorized user of the source.
- 5.7 When the source is unlocked or in the exposed position, a chain (or rope) with a warning sign is to be placed across the doorway. In addition, one of the following two conditions must also be met:

- 5.7.1 Source operator in attendance

- 5.7.2 Room locked

## 6.0 APPARATUS

- 6.1 J. L. Sheppard Model 28-10, Serial Number 603 Gamma irradiator with nominal 130 Curies Cs-137 source.
- 6.2 Operational gamma survey instrument.
- 6.3 Motor driven specimen table with adjustable height and distance from source.
- 6.4 Wall mounted gamma monitoring system consisting of a detector, a remote exposure rate indicator and two red warning lights.
- 6.5 Red warning light above the source indicating exposure of the source when the source rod is raised.
- 6.6 Keys to the room, the source rod, and the calibrator.
- 6.7 Photoelectric controlled source interlock consisting of infrared light emitter/receiver, reflector and electrical interlock to source controls.

## 7.0 INSTRUCTIONS

### 7.1 Preliminary Instructions

- 7.1.1 Obtain keys and sign source utilization log.
  - 7.1.2 Verify that no one is within the irradiation area. All operation of the source controls is to be done from behind the source.
  - 7.1.3 Unlock padlock to free source rod. Place small key in calibrator and turn it to the right. The source can now be exposed by raising the source rod.
  - 7.1.4 Raise source rod and verify that red light on source is on.
  - 7.1.5 With the source still exposed, break the light beam marking

the boundary to the irradiation area. Verify that the source rod drops and terminates the exposure.

- 7.1.6 Check that a satisfactory performance check of the source has been done for that day. If none has been done, perform the required check in accordance with procedure T-18 and record the result.

## 7.2 Instructions Proper

- 7.2.1 Refer to the exposure rate data for the source (reference 4.3) for the dose rate required. Move the specimen table to the proper location.
- 7.2.2 Set object for irradiation on the specimen table so that the center of the object is at the reference point on the table top. If necessary, adjust the height of the table to make sure the object and the beam port are horizontally aligned.
- 7.2.3 If it is necessary to view the object during the irradiation (such as the meter on a survey instrument), focus the closed circuit television camera so that an acceptable picture is visible on the remote television display. Adjust remote display so that it is conveniently visible from behind the source.
- 7.2.4 Withdraw required attenuators for the dose rate desired.
- 7.2.5 If a timed, integrated exposure is to be used, push the button at the rear of the source to reveal the thumb wheels. Set the desired time in minutes by dialing in the appropriate numbers. When the source rod is raised, the exposure will begin. The timer will then terminate the exposure at the end of the pre-set interval.
- 7.2.6 For survey instrument calibration, the source is operated manually for a desired dose rate. After exposing the instrument and observing the response, adjustments are often made on the instrument. Before stepping in front of the source, lower source rod, insert all attenuators and verify source is still not exposed.
- 7.2.7 After completion of the irradiation, lower the source rod and replace the attenuators. Secure source by removing the key from the calibrator and locking the padlock on the source rod to prevent it from being raised.
- 7.2.8 Lock the room and return the keys to their proper location.

## 8.0 REPORTING

- 8.1 Report any deficiencies or unusual results to the manager.

8.2 Report any possible exposure to individuals or any problems with the source or alarm system operation to the Radiation Safety Officer.

9.0 RECORDING

9.1 Record the required information on the source utilization log.

10.0 ATTACHMENTS

10.1 RMC Source Utilization Log. Use of RMC Source #53.

10.2 RMC Authorized Source User and Approval Form.



USE OF RMC SOURCE #53

[illegible]

\*\*Place a check mark in the "KEY RETURNED" column to signify the keys are returned.

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## RMC AUTHORIZED SOURCE USER AND APPROVAL FORM

Procedure Familiarity  
(User's initials and date)

User	Procedure R-9	Procedure R-15	Approval