



NONDESTRUCTIVE TESTING SERVICES

T 85-103
Rev 0
September 6, 198

TRUTOM U.S. LTD.

DOSIMETER CALIBRATION

8510240568 851003
REG1 LIC30
06-20755-01 PDR

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DOSIMETER CALIBRATION

PURPOSE

When Dosimeters are calibrated by Trutom (U.S.) Limited, the following rules and procedures shall be adhered to.

RULES

Dosimeters shall be calibrated whenever a malfunction is suspected. As a minimum, each Dosimeter shall be calibrated once per year.

Calibration of Dosimeters shall be performed by the Radiation Safety Officer of Trutom (U.S.) Limited.

PROCEDURE

- 1) Dosimeter Corporation Desk-Top Dosimeter Calibrator Model 3060 shall be used.
- 2) Given a known dose rate per hour, calculate the amount of time necessary to expose Dosimeter to 20% of scale.
- 3) Remove Dosimeter and record indicated exposure on calibration record.
- 4) Replace Dosimeter and calculate time necessary to expose Dosimeter to 50% of scale.
- 5) Remove Dosimeter and record indicated exposure on calibration record.
- 6) Replace Dosimeter and calculate time necessary to expose Dosimeter to 80% of scale.
- 7) Remove Dosimeter and record indicated exposure on calibration record.
- 8) Record percent of error between actual exposure and indicated exposure on all three readings on calibration record.
- 9) Recharge Dosimeter to zero and allow to sit for 24 hours.

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DOSIMETER CALIBRATION, P.2

- 10) After 24 hours, record the amount of drift on calibration record.
- 11) Any Dosimeter with a percent of error greater than 20% shall be removed from service.
- 12) Any dosimeter with a leakage rate greater than 10% shall be removed from service.

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DOSIMETER CALIBRATION RECORD

Manufacturer: _____

Range: _____

	Actual Exposure	Indicated Exposure	% Error
Date:	_____ mr	_____ mr	_____ %
Leakage Rate:	_____ mr	_____ mr	_____ %
Source:	_____ mr	_____ mr	_____ %
Serial Number:	_____		

Date:	_____ mr	_____ mr	_____ %
Leakage Rate:	_____ mr	_____ mr	_____ %
Source:	_____ mr	_____ mr	_____ %
Serial Number:	_____		

Date:	_____ mr	_____ mr	_____ %
Leakage Rate:	_____ mr	_____ mr	_____ %
Source:	_____ mr	_____ mr	_____ %
Serial Number:	_____		

Date:	_____ mr	_____ mr	_____ %
Leakage Rate:	_____ mr	_____ mr	_____ %
Source:	_____ mr	_____ mr	_____ %
Serial Number:	_____		

TRUTOM (U.S.) LIMITED

By: _____

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Section #6, continued

6.A.II. RADIOGRAPHIC FACILITIES AT BRANFORD, CONNECTICUT
(Iridium 192 only proposed April 2, 1984, to be completed by September 1, 1985)

- 1) Room Construction (See sketch)
- | | |
|-----------------------|--|
| Work area | -7'x8'x5' high |
| Wall Thickness | -32" to 8' high all around |
| Construction of Walls | -High density concrete block |
| Wall Height | -8ft. high density block |
| Roof Thickness | -8" high density concrete block |
| Roof Construction | -2"x6 Planks and 3/4" plywood
-8" concrete blocks |

- 2) Anticipated Radiation Levels
- Walls. The worst case radiation level will be when the source is at any extremity of the work area. The unshielded dose rate at 1' of 100 ci of Iridium 192 is 590,000 Mr/hr.

32" of concrete is 19 HVL for Ir 192. This leaves 1.13 Mr/hr.

Roof. The worst case radiation level at the roof of the building will be affected by the following conditions:

- At no time will source be used with less than 1" of lead collimation.
- At no time will the unshielded beam be allowed to reach any point above 5' high on any of the walls. 1" of lead represents 5 HVL with Ir 192. 8" of high density concrete Block represents 5 HVL with IR 192.

10' is the minimum distance from the source to the building roof.

100ci IR 192 is 590,000 Mr/hr at 1'.

@10' is 5,900 Mr/hr at 1'. (distance to roof).

@ 10 HVL is 5.76 Mr/hr (combined shielding of colimator and roof).

3) Safety Features

- Safety system is built around a Philips Gamma alarm Model PW 4044/0. The alarm is set to detect radiation levels in excess of .5 Mr/hr. It is positioned within the exposure room as shown in the sketch. When the alarm detects radiation, the following will occur:

- Six red lights shown in sketch will flash.
- Red light on Gammalarm will flash.

- If door is opened, audible alarm will sound.

Section #6, continued.6 A.II. RADIOGRAPHIC FACILITIES AT BRANFORD, CONNECTICUT

- b. The maximum amount of radiation which could possibly reach the roof of the building is 5.76 Mr/hr. The roof will be posted with "Radiation Area" signs, as per the sketch. Rope shall be used to restrict that area of the roof, as per the sketch.
- c. Signs will be permanently posted "Radiation Area" on roof, as per sketch (eight places).
- d. Signs will be permanently posted "High Radiation Area" on door and walls of exposure room, as per sketch. (nine places)
- e. The exposure room will be kept locked at all times except when under the direct supervision of a radiographer or radiographer's assistant, who is physically present.
- f. The source will be kept below 5' high within the "work area". Further, the direct beam will not be directed towards a spot 5' above any wall. No exposures shall be made outside of the "work area" (see sketch).
- g. A collimator of 1" of lead or the equivalent shall always be used.
- h. The Ir 192 sources shall be stored in the room by locking them in a metal box secured from removal in the room.
- i. The Co 60 camera shall be secured in the room by a padlock and chain. It will not be used in this room.
- j. Whenever possible, the direct beam will be directed towards the floor.
- k. "Radioactive Material" signs will be permanently posted on the door to room and on storage containers.
- l. Door to exposure room will be kept lock at all times when not in use.

6.B. RADIATION DETECTION EQUIPMENT

1. Exposure room (permanently installed) in Branford, CT Philips Pw 4044/0 Gamma alarm. In Williston VT Tech-Op Gamma alarm 492D.
2. Use of technician's (portable) survey meters, Model Victoreen 492 . . .
3. Audible Dosimeter, Model Prima IIA by RMI .