

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

Objective

This procedure establishes the requirements for individual monitoring devices for radiation exposure on campus.

Scope

This procedure applies to all personnel, students, and visitors at UTHSC.

Roles

Activities mandated in this procedure will be conducted by the UTHSC Radiation Safety Officer and other UTHSC Research Safety Affairs officers authorized by the Radiation Safety Officer or the Research Safety Affairs Chief Safety Officer.

Definitions

NVLAP - National Voluntary Laboratory Accreditation Program of the National Institute of Standards and Technology

Individual monitoring devices - ("individual monitoring equipment") devices designed to be worn by a single individual for the assessment of dose equivalent, such as film badges, thermoluminescence dosimeters (TLDs), pocket ionization chambers, and personal ("lapel") air sampling devices.

Very high radiation area – an area accessible to individuals in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in 1 hour at 1 meter from a source of radiation or 1 meter from any surface that the radiation penetrates.

High radiation area - an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour at 30

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

centimeters from the source of radiation or from any surface that the radiation penetrates.

Shallow-dose equivalent (H_s) - which applies to the external exposure of the skin of the whole body or the skin of an extremity, is taken as the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm²)

Declared pregnant woman - a woman who has voluntarily informed her employer, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

Deep-dose equivalent (DDE) - (H_d), which applies to external whole-body exposure, is the dose equivalent at a tissue depth of 1 cm (1000 mg/cm²)

Lens dose equivalent applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm²).

Procedure

- I. NAVLAP accredited individual monitoring devices must be assigned to all persons working in areas subject to license R-79019-D30 or an x-ray registration meeting one or more of the following criteria:
 - A. Adults likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of the limits in Table 1
 - B. Minors likely to receive, in 1 year from radiation sources external to the body, a deep dose equivalent in excess of 0.1 rem (1 mSv), a lens dose equivalent in excess of 0.15 rem (1.5 mSv), or a shallow dose equivalent to the skin or to the extremities in excess of 0.5 rem (5 mSv)
 - C. Declared pregnant women likely to receive during the entire pregnancy, from radiation sources external to the body, a deep dose equivalent in excess of 0.1 rem (1 mSv)
 - D. Individuals entering a high or very high radiation area
 - E. Exposure groups listed in Table 3

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

- F. Table 2 contains a list of facility departments and monitoring groups that are currently assigned individual monitoring devices. The list will be reviewed and updated annually and when program modifications occur.
- II. Persons requiring an individual monitoring device will be required to complete the following:
- A. Complete a Previous Exposure History information form and submit it to the Research Safety Affairs Office for processing.
 - 1. History must include the following:
 - a. Dose received for the current calendar year
 - b. Attempt to obtain lifetime cumulative dose
 - 2. Suitable documentation of dose can be one or more of the following:
 - a. a written statement disclosing the nature and the amount of any occupational dose the individual may have received during the current year. Such statement shall be signed by the individual or the individual's most recent employer for work involving radiation exposure.
 - b. the record of lifetime cumulative radiation dose, an up-to-date TN Form RHS 8- 1H, or equivalent. Such form shall be signed by the individual and countersigned by an appropriate official of the most recent employer for work involving radiation exposure. If the individual is employed by a person other than the licensee or registrant, the countersignature shall be from the current employer.
 - c. From the most recent employer obtain reports of the individual's dose equivalent(s) for work involving radiation exposure. If the individual is employed by a person other than the licensee or registrant the report shall be from the individual's current employer. Reports may be obtained by telephone, telegram, electronic media or letter. The licensee or registrant shall request a written verification of the dose data if the authenticity of the transmitted report cannot be established.

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

3. The licensee or registrant shall record the exposure history together with all information required on Form RHS 8-1H6, or other clear and legible record. The form or record shall show each period in which the individual received occupational exposure and be signed by the individual receiving the exposure. For each period for which the licensee or registrant obtains reports, the licensee or registrant shall use the dose shown in the report in preparing [Form RHS 8-1H](#).

For any period in which the licensee or registrant does not obtain a report, the licensee or registrant shall place a notation on [Form RHS 8-1H](#) indicating the periods of time for which data are not available.

4. If the licensee or registrant is unable to obtain a complete record of an individual's current and previously accumulated occupational dose, the licensee or registrant shall:
 - a. In establishing administrative controls under paragraph (6) of Rule 0400-20-05-.50 for the current year, reduce the individual's allowable dose limit by 1.25 rems (12.5 mSv) for each quarter for which records were unavailable and the individual could have received occupational exposure; and
 - b. Not allow the individual to be available for planned special exposures.
5. The licensee or registrant shall retain the records on Form RHS 8-1H or equivalent until the Division terminates each pertinent license or registration requiring this record. The licensee or registrant shall retain records used in preparing Form RHS 8-1H for three (3) years after the record is made.

- B. Complete the assigned radiation training assigned by the UTHSC Radiation Safety Office. The assigned training will include instruction on the proper use of assigned individual monitoring device(s) and the wearer's responsibilities for properly using the device(s).

- III. Upon termination of employment or study, all assigned individual monitoring devices must be returned to the UTHSC Research Safety

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

Affairs office by the wearer of the device.

- IV. A dose estimate must be performed by Research Safety Affairs for all lost or damaged individual monitoring devices. The wearer of a lost or damaged device has the following responsibilities:
 - A. Report a lost or damaged individual monitoring device upon discovery.
 - B. Complete a dose estimate form and return to the UTHSC Research Safety Affairs in a timely fashion.
- V. A dose investigation will be conducted when a deep-dose in excess of 40 millirem per month or 120 millirem per quarter is received by a monitoring individual.
 - A. The individual will be emailed a Radiation Exposure Investigation Form to complete.
 - B. Research Safety Affairs will review the completed form
 - C. Any dose adjustments based on the use of leaded garments when the exposure was received will be made.
- VI. Retention and recording of results from individual monitoring devices must including the following data:
 - A. Records of deep-dose equivalent to the whole body, lens-dose equivalent, shallow-dose equivalent to the skin and shallow-dose equivalent to the extremities for all individuals monitored;
 - B. Reference TN STANDARDS FOR PROTECTION AGAINST RADIATION 0400-20-05-.135 if a dose from uptake of radionuclides has been received as well.
 - C. Dose entries must be made at least annually by the UTHSC Research Safety Affairs Office
 - D. All data required by TN Form RHS 8-2C must be recorded clearly and legible on a form
 - E. These records required under this rule should be protected from public disclosure because of their personal privacy nature.
 - F. The licensee or registrant shall maintain the records of dose to an embryo/fetus with the records of dose to the declared pregnant woman. The declaration of pregnancy shall also be kept on file but may be maintained separately from the dose records.

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

G. The licensee or registrant shall retain each required form or record until the Division terminates each pertinent license or registration requiring the record.

Tables

Table 1 annual radiation exposure limits for adult workers

Region of the body	Annual Dose limit [Rem]
Deep-dose equivalent	5
Any individual organ or tissue (except lens of the eye)	50
Shallow-dose equivalent	50
Lens-dose equivalent	15

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

Table 2 Departments using individual monitoring devices and the source of radiation exposure

Department	X-ray	RAM	Badge system	Note
Research Safety Affairs -Rad Safety	X	X	Landauer	
Forensic Ctr	X		Landauer	
Clin Res-Methodist	X		Landauer	
Endodontics	X		Landauer	
Oral Diagnosis	X		Landauer	
LACU	X		Landauer	
Pediatric Dentistry	X		Landauer	
Pediatric Dentistry - LaBonheur	X		Landauer	
Orthopedic Surgery	X		Landauer	
Pharmacy		X	Landauer	
Oral and Max Surgery	X		Landauer	
Cardiology	X		Mirion	Resident

2

Table 3 Dosimetry required for worker and student groups at UTHSC

Exposure Group	Ring badge	Body dosimeter
Workers or students potentially exposed to an external deep dose, shallow dose, or eye dose annually in excess of 10% of the dose limits in table 1		X
Workers or students potentially exposed to an extremity dose to the hands annually in excess	X	

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

of 10% of the dose limits in table 1		
Workers and students assisting patients while receiving radiographs or in the room when radiographs are being taken.		X
Workers and students using hand held x-ray machines	X (for each hand)	X

Penalties/Disciplinary Action for Non-Compliance

License violations are subject to civil penalties up to \$5,000 per day per violation. In the event of a threat to public health and safety, the Division has the right to confiscate radiation sources.

References

Instructions to dosimeter wearers
Exposure Investigation Form
Dose

- I. Tennessee Administrative Code Title 0400 - Environment and Conservation Subtitle 0400-20 - Division of Radiological Health (§§ 0400-20-04-.01 — 0400-20-13-.08)
- II. Tennessee Administrative Code Title 0400 - Environment and Conservation Subtitle 0400-20 - Division of Radiological Health (§§ 0400-20-05-.70 - 0400-20-05-.71)
- III. Tennessee Form RH
- IV. License R-79019-D30

UT Health Science Center: RSP23 Dosimetry Procedure	
Version 1	Publication Date: 01/13/2025

Responsible Official & Additional Contacts for procedure clarification, interpretation and training

Research Safety Affairs (radsafety@uthsc.edu)

Ph: (901)-448-6114

Related Policies/Guidance Documents

- I. [Tennessee Administrative Code Title 0400 - Environment and Conservation Subtitle 0400-20 - Division of Radiological Health \(§§ 0400-20-04-.01 — 0400-20-13-.08\)](#)
- II. Tennessee Administrative Code Title 0400 - Environment and Conservation Subtitle 0400-20 - Division of Radiological Health §§ 0400-20-05-.71
- III. Tennessee Administrative Code Title 0400 - Environment and Conservation Subtitle 0400-20 - Division of Radiological Health §§ 0400-20-05-.133
- IV. Tennessee Administrative Code Title 0400 - Environment and Conservation Subtitle 0400-20 - Division of Radiological Health §§ 0400-20-05-.135
- V. [NUREG 1556 Volume 11 Revision 1](#)
- VI. License R-79019-D30