

University of Maryland Baltimore

Radiation Safety Standard Operating Procedure

Procedure Number: 3.1.1

Title: External Dosimetry Program

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Chair, Radiation Safety Committee

PROCEDURE 3.1.1 – EXTERNAL DOSIMETRY PROGRAM

1.0 Purpose:

This procedure provides specific instructions for:

- Enrolling individuals in UMB's Individual Radiation Monitoring Program;
- Issuing, wearing, and retrieving individual dosimeters;
- Determining individual radiation doses resulting from external and internal occupational radiation exposure; and
- Creating individual monitoring program records.

2.0 Scope:

This procedure applies to all external radiation exposure monitoring activities at UMB.

3.0 Procedure:

3.1 *Identification of Individuals Requiring External Dosimeters*

3.1.1. The designated representative in each work group shall coordinate with EHS to ensure assigned individuals are evaluated for the external dosimetry program.

3.1.2. EHS shall enroll in the external monitoring program individuals who:

- Potentially may receive, in a year, a dose equivalent exceeding 100 mrem; or
- May enter a high or very high radiation area; or
- Are involved in operations that use more than 1 mCi of high energy beta or gamma emitters at any one time; or
- Declare pregnancy; or
- Are involved in the routine administration of radiation to humans (i.e., Nuclear Medicine, Radiation Oncology, Radiology)

EHS will perform an evaluation of the environment and work practices that the worker may encounter. If the worker is not expected to receive 100 mrem in a year, they will not be assigned a dosimeter. Workers may receive extremity monitors (ring badges) if deemed necessary by EHS.

EHS may enroll other individual's in the external monitoring program, such as individuals who are concerned about their radiation exposure, at the discretion of the RSO. Once enrolled, these individuals must comply with the requirements of the program.

3.2. Determination of Prior and Allowable Individual Doses

- 3.2.1. Prior to allowing an individual to receive an occupational dose that requires individual monitoring, EHS must determine the individual's prior occupational dose. EHS shall:
- Determine the individual's occupational dose received during the current year; and
 - Attempt to obtain records of the individual's lifetime cumulative occupational radiation dose, if applicable.

EHS will investigate individuals indicating previous exposure histories, and will request past exposure histories from their previous employers.

- 3.2.2. When determining the individual's prior occupational dose during the current year, EHS may accept a written, signed statement from either the individual or the individual's most recent employer that discloses the nature and amount of any occupational dose received during the current year.
- 3.2.3. When determining the individual's lifetime occupational cumulative radiation dose, EHS may accept a current MDE Form ND 216 or equivalent, signed by the individual and countersigned by an appropriate official of the individual's most recent employer (for work involving occupational radiation exposure). If the individual is not a UMB employee, EHS may accept a form countersigned by the individual's current employer.
- 3.2.4. EHS may accept reports of individual dose transmitted by telephone, telegram, letter, or facsimile, as long as these submittals are deemed to be verifiable.
- 3.2.5. EHS shall maintain records of individual dose history on MDE Form ND216 or equivalent forms that contain all of the information required on that form.

3.3. Determination of Individual Allowable Dose

- 3.3.1. EHS shall reduce the individual's allowable dose in the current year by the amount of any prior occupational dose received during the year.
- 3.3.2. If EHS is unable to obtain a complete record of the individual's current and previously accumulated occupational dose, EHS shall:
- Assume the individual was pursuing activities involving occupational radiation exposure during each quarter of the current year for which records are unavailable; and
 - Reduce the individual's allowable occupational dose by 1.25 rem for each quarter of the current year that records are unavailable.

3.4. *Issuance of Personnel Dosimeters*

- 3.4.1. Following notification that a new employee requires or desires enrollment in the external monitoring program, EHS shall:
- Determine the individual's prior occupational dose (see above);
 - Assign the individual to the proper monitoring group (types of dosimeters, wear location(s), account and series numbers, dosimeter exchange/bioassay frequency, etc.); and
 - Provide the required dosimeters to the individual or his work group coordinator.
- 3.4.2. EHS shall enter the required tracking information into the tracking software and transmit the information to the dosimetry processor.

3.5. *Use of Personnel Dosimeters*

- 3.5.1. Monitored individuals should wear whole body dosimeters on the front of the body, between the waist and neck, unless otherwise directed by EHS. Monitored individuals should wear other dosimeters (e.g. extremity dosimeters, waist badges) on the maximally exposed portion of the body, as directed by EHS. Radiology personnel that receive two badges should wear one on the collar and one on the waist under the lead apron.
- 3.5.2. Individuals shall not wear or position their dosimeters in a manner that falsely or deceptively indicates a radiation dose not actually received by the individual.
- 3.5.3. Individuals who chose not to wear assigned dosimeters may be removed from activities involving radiation or radioactive materials.

3.6. Return of Personnel Dosimeters

- 3.6.1. With the assistance of the work group dosimetry program coordinator, EHS shall collect issued dosimeters at the end of the established monitoring period. Individuals must return their badges within 15 days of receiving the badges for the next monitoring period.
- 3.6.2. Should any individual fail to return his or her dosimeter in accordance with the established schedule, EHS shall initiate action to obtain the dosimeter, including:
- A letter notifying the individual that the dosimeter has not been returned
 - A \$10 replacement fee for a lost or non-returned dosimeter
 - A dose will be assigned to the individual based on previous history, up to a maximum of 1.25 rem/quarter.

Should an individual demonstrate an unwillingness to follow the established schedule, their authorized user status may be suspended or revoked.

- 3.6.3. EHS shall sort the dosimeters as required by the dosimetry processor, identifying unused dosimeters as necessary, and transfer the dosimeter to the dosimetry processor.
- 3.6.4. Unused dosimeters will be investigated to determine if the individual should be removed from monitoring or if the individual is not following proper procedures.

3.7. Processing of Personnel Dosimeters

Note: The NVLAP accreditation requirements do not apply to processing of extremity dosimeters.

EHS shall retain the services of a vendor who is accredited under the National Voluntary Laboratory Accreditation Program to process all personnel dosimeters issued to ensure compliance with COMAR Part D individual monitoring requirements. The vendor's NVLAP accreditation shall include those NVLAP categories that most closely approximate the types of radiation present at UMB.

3.8. Determination of Individual Dose Equivalents

Dose equivalents shall be determined as specified in Procedure 3.1, *Individual Monitoring Program*.

3.9 Evaluation of External Dose Equivalents

Upon receipt of exposure results from the dosimetry provider, Radiation Safety shall evaluate dose levels to determine if ALARA action levels have been exceeded. The RSO and RSC will evaluate employee exposure in accordance with Radiation Safety Procedure 1.6, *ALARA Program*.

4.0 Records and Reports

4.1. Records

- 4.1.1. EHS shall maintain required records in accordance with the requirements of Procedure 1.2, *Radiation Safety Records*.
- 4.1.2. Records of individual monitoring results shall include those specified in Procedure 3.1, *Individual Monitoring Program*.

4.2. Reports

UMB is required to provide reports to monitored individuals regarding their personal radiation exposure. This includes routine reports to the authorized user and dosimetry coordinator following each monitoring period. Additionally, EHS must provide annual exposure report to the individual. This report should be sent once data from the previous year has been received from the dosimetry service provider.

UMB is also required to provide an exposure report to individuals leaving the dosimetry program. This report should be provided not less than 90 days following termination. The report will be sent to the last available address of the individual, or to the authorized user or department where they worked.

UMB is required to report to MDE incidents involving exposures of individuals exceeding the regulatory dose equivalent limits. All reports to MDE shall be copied to the individual in question.

See Procedure 1.3, *Radiation Safety Reports*, for details on these reporting requirements.

5.0 References:

Code of Maryland Regulations 26.12.01.01
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UMB Radiation Safety Program