



U.S. ATOMIC ENERGY COMMISSION

# REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

## REGULATORY GUIDE 8.3

### FILM BADGE PERFORMANCE CRITERIA

#### A. INTRODUCTION

The Atomic Energy Commission's "Standards For Protection Against Radiation", 10 CFR Part 20, requires licensees to supply personnel monitoring equipment to and require the use of such equipment by, individuals who enter restricted areas under certain specified conditions (§20.202, 10 CFR Part 20). Film badges are included in the definition of personnel monitoring equipment. The Commission's regulation "Licensing of Radiography and Radiation Safety, Etc.", 10 CFR Part 34, requires that radiographers and radiographer's assistants wear a film badge and either a pocket chamber or a pocket dosimeter. While equipment performance criteria are not specified in the regulations, licensees are required to make such measurements as may be necessary to assure that exposures are in compliance with the regulations (§20.201(b), 10 CFR Part 20).<sup>1</sup> This guide describes acceptable film badge performance criteria.

#### B. DISCUSSION

The Health Physics Society prepared a standard "Film Badge Performance Criteria," N13.7-1972,<sup>2</sup> for the N13 Committee of the American National Standards Institute, Inc. (ANSI). The standard was approved by ANSI on July 11, 1972. It provides film badge performance criteria for several categories of radiations following exposure under specified conditions. Because performance criteria are intimately connected with the methods of testing, a testing procedure is described. The stated intention of the standard is to consider the performance of film badge dosimetry under the most reproducible conditions. Insofar as possible, uncertainties introduced by scattering, unspecified

<sup>1</sup> Records of such measurements must be retained in accordance with §20.401, 10 CFR Part 20.

<sup>2</sup> Copies may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

radiation sources, and nonuniform irradiations are eliminated from the prescribed procedures. The problems related to the use of film badges for personnel dosimetry, which include these sources of uncertainty, are not considered in this standard.

Although quality control procedures are necessary if specified film badge performance criteria are to be met, the standard does not require quality control procedures for many aspects of film badge dosimetry, such as photographic processing, densitometry, use of control and calibration films, latent image fading, and film identification. Instead the standard enumerates some advisory "Principles of Good Practice" in film badge dosimetry.

#### C. REGULATORY POSITION

Film badge performance and practices meeting the criteria set forth in ANSI N13.7-1972, "Film Badge Performance Criteria," will be considered acceptable to the extent that such performance and practices are covered by the criteria, subject to the following:

1. The Foreword of ANSI N13.7-1972, notes what may appear to be an omission in the exposure range for high-energy photon exposure categories, i.e., the low-exposure range is 0.04 to 1.00 R and the high-exposure range is 20 to 800 R. This was not an oversight, nor was it intended to imply that film badge services should omit the excluded region from their range of coverage. It is specifically mentioned under the "Principles of Good Practice", Section 5, that film emulsion components should be chosen to cover an exposure range from 0 to 800 R or more for high-energy photon exposures.
2. As noted in ANSI N13.7-1972, the exposure range

#### USAEC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the AEC Regulatory staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

Published guides will be revised periodically, as appropriate, to accommodate comments and to reflect new information or experience.

Copies of published guides may be obtained by request indicating the divisions desired to the U.S. Atomic Energy Commission, Washington, D.C. 20545. Attention: Director of Regulatory Standards. Comments and suggestions for improvements in these guides are encouraged and should be sent to the Secretary of the Commission, U.S. Atomic Energy Commission, Washington, D.C. 20545. Attention: Chief, Public Proceedings Staff.

The guides are issued in the following ten broad divisions:

- |                                   |                        |
|-----------------------------------|------------------------|
| 1. Power Reactors                 | 6. Products            |
| 2. Research and Test Reactors     | 7. Transportation      |
| 3. Fuels and Materials Facilities | 8. Occupational Health |
| 4. Environmental and Siting       | 9. Antitrust Review    |
| 5. Materials and Plant Protection | 10. General            |

for beta-ray and neutron categories in that standard should be raised. The AEC "Notice Regarding Need for Establishment of Film Dosimetry Calibration Laboratory" published in the *Federal Register* September 4, 1963 (28 F.R. 9678), set forth the following interim film badge dosimetry performance criteria for those categories which are hereby made a part of this Regulatory Guide:

<b>Beta</b>	
Uranium	50 mrems - 10 rems
>0.5 MeV Max. energy (source other than uranium)	50 mrems - 800 rems
<b>Neutron</b>	
<0.04 eV (thermal)	125 mrems - 100 rems
1 - 10 MeV (fast)	125 mrems - 10 rems