Designation: E1034 – 95 (Reapproved 2013)

Standard Specification for Nuclear Facility Transient Worker Records[1]

This standard is issued under the fixed designation E1034; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

There is a high degree of concern in the nuclear industry regarding the ability of present records keeping practices to adequately monitor the cumulative radiation doses of individual transient workers. This concern arises from the fact that the transient worker moves rapidly among the nuclear facilities, in some cases working at as many as four or more facilities within one calendar quarter. The accurate monitoring of a transient worker's cumulative radiation dose depends, in part, on the individual worker's ability (and willingness) to provide a correct record of his occupational radiation exposure. At nuclear facilities licensed by the U.S. Nuclear Regulatory Commission (NRC), these data presently are supplied by the worker on forms NRC-4 and NRC-5. Similar procedures are followed at other nuclear facilities (see Note 1). Accurate occupational radiation exposure data are required to ensure that the radiation doses that an individual transient worker will receive are within regulatory limits.

Another problem confronting the owners of nuclear facilities is how to in-process large numbers of temporary workers efficiently. These workers may be required for such activities as the decontamination and decommissioning of a nuclear facility, the annual refueling of a nuclear power plant, or a major special modification to an operating nuclear facility. In-processing involves determining a worker's occupational radiation exposure history, security clearance, health status, ability to wear and use respiratory protective equipment, and training and qualification for work in controlled areas. In-processing is the responsibility of the licensee, and depends on the cooperation of the worker and the worker's present and past employers and other past contracting licensees.

In-processing is complicated by the fact that different facilities keep the required information on different forms in varying degrees of detail. In-processing one worker often can take several days and result in a loss of productive time as well as increased staffing costs for the facility operator.

One possible solution to these problems is a cooperative effort within the nuclear industry to develop a common or central data base that can be accessed to obtain pertinent historical data on a worker. A central record keeping system (CRS) is envisioned for this purpose. Such a system could help reduce in-processing time for temporary workers.

However, some degree of standardization is necessary before a centralized record keeping system is possible. This specification standardizes the necessary content of transient worker records.

1. Scope

1.1 This specification covers the required content and provides retention requirements for records needed for in-processing of nuclear facility transient workers.

1.2 This specification applies to records to be used for in-processing only.

1.3 This specification is not intended to cover specific skills records (such as equipment operating licenses, ASME inspection qualifications, or welding certifications).

1.4 This specification does not reduce any regulatory requirement for records retention at a licensed nuclear facility.

NOTE 1—Nuclear facilities operated by the U.S. Department of Energy (DOE) are not licensed by the U.S. Nuclear Regulatory Commission (NRC), nor are other nuclear facilities that may come under the control of

[1] This specification is under the jurisdiction of ASTM Committee E10 on Nuclear Technology and Applicationsand is the direct responsibility of Subcommittee E10.03 on Radiological Protection for Decontamination and Decommissioning of Nuclear Facilities and Components.

Current edition approved Jan. 1, 2013. Published January 2013. Last previous edition approved in 2008 as E1034-95(2008). DOI: 10.1520/E1034-95R13.

the U.S. Department of Defense (DOD) or individual agreement states. The references in this specification to licensee, the U.S. NRC Regulatory Guides, and Title 10 of the U.S. Code of Federal Regulations are to imply appropriate alternative nomenclature with respect to DOE, DOD, or agreement state nuclear facilities. This distinction does not alter the required content of records needed for in-processing of nuclear facility transient workers.

NOTE 2—This specification does not define the form of the required worker records (such as a passport or central computerized record keeping system).

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E1168 Guide for Radiological Protection Training for Nuclear Facility Workers

2.2 *ANSI Standards:*

ANSI N13.6 American National Standard Practice for Occupational Radiation Exposure Records Systems[3]

2.3 *Nuclear Regulatory Commission Documents:*

Regulatory Guide 8.7, Instructions for Recording and Reporting Occupational Radiation Exposure Data[4]

Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection[4]

NUREG/CR-0041, Manual of Respiratory Protection Against Airborne Radioactive Materials[4]

2.4 *CFR Documents:*

Notices, Instructions, and Reports to Workers; Inspections, 10CFR, Part 19[4]

Standards for Protection Against Radiation, 10CFR, Part 20[4]

2.5 *American Nuclear Insurers Documents:*

ANI/MAELU Information Bulletin 80-1A, Nuclear Liability Insurance Records Retention[5]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *absorbed dose(D), n*—for purposes of records maintained in accordance with this specification, absorbed dose is the energy absorbed per unit mass at a specific place in a material.

3.1.1.1 *Discussion*—The SI unit of absorbed dose is the gray (Gy), equal to 1 J/kg (10,000 ergs/g). The traditional unit of absorbed dose is the rad. One Gy = 100 rad. As used in this specification, "absorbed dose" stands for the absorbed dose in soft tissue.

3.1.2 *committed dose equivalent (CDE), n*— dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

3.1.3 *committed effective dose equivalent (CEDE), n*—the sum of the committed dose equivalents to various tissues in the body, each multiplied by its weighting factor. It does *not* include contributions from external dose.

3.1.4 *controlled area, n*—an area of a nuclear facility encompassed by physical barriers to which access is controlled.

3.1.4.1 *Discussion*—This definition is equivalent to the *restricted area* definition for NRC and Agreement State Licensees. It is not the same as the *controlled area* definition with which NRC and Agreement State Licensees are familiar.

3.1.5 *deep dose equivalent (DDE), n*—dose equivalent delivered to tissue at a depth of 1.0 cm or more from the surface.

3.1.6 *dose equivalent (H), n*—the product of D, Q, and N, at the point of interest in tissue, where D is the absorbed dose, Q is the quality factor, and N is the product of any other modifying factors.

3.1.6.1 *Discussion*—The SI unit of dose equivalent is the sievert (equal to 1 J/kg). The traditional unit of dose equivalent is the rem. One Sv = 100 rem.

3.1.7 *employer, n*—a person or concern that employs persons for wages or salary. Note that a worker may have more than one employer at a given time.

3.1.8 *estimated dose, n*—dose data supplied by the licensee to the worker prior to the determination of the official record dose (see section 10CFR Part 19 or equivalent).

3.1.8.1 *Discussion*—Estimated doses are provided at the worker's request and generally when the worker is terminating a work assignment involving radiation exposure at a licensee's facility.

3.1.9 *external dose equivalent, n*—dose equivalent due to radiation sources located outside the body.

3.1.10 *extremity, n*—hands and arms below the elbow or feet and legs below the knee (see 3.1.23).

3.1.11 *extremity dose, n*—the external (shallow/deep) dose to the extremities.

3.1.12 *eye dose equivalent, n*—dose equivalent to the lens of the eye from external radiation sources is taken as the dose equivalent at a tissue depth of 0.3 cm (300 mg/cm^2).

3.1.13 *in-processing, n*—the determination, prior to starting work, of a worker's previous occupational radiation exposure history, security clearance, health status, ability to wear and use respiratory and other personal protective equipment, and training and qualification for work in controlled areas.

3.1.14 *nuclear facility, n*—a facility whose operations involve (or involved) radioactive materials in such form and quantity that a nuclear hazard potentially exists (or existed) to the employees and the general public. Included are facilities that are (or were) used to produce, process, or store radioactive materials (see Note 1). Some examples are: nuclear reactor (power or research), fuel fabrication plant, fuel reprocessing plant, uranium or thorium mill, UF_6 production plant, radiochemical laboratory, and radioactive waste disposal site.

3.1.15 *occupational radiation exposure, n*— radiation exposure resulting from, and received in, the course of an individual's employment.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org..

[4] Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

[5] Available from American Nuclear Insurers, 95 Glasterburg Boulevard, Suite 300, Glasterburg, CT 06033-453.

3.1.16 *official record dose, n*—dose data supplied by the licensee to the worker and the NRC in accordance with 10CFR20.2206 (or equivalent).

3.1.17 *radiation, n*—in the context of this specification, "radiation" refers to ionizing radiation. Ionizing radiation is any electromagnetic or particulate radiation capable of producing ions, directly or indirectly, by interaction with matter.

3.1.18 *radiation exposure, n*—in the context of this specification, "exposure" refers very broadly to the act or state of being irradiated by ionizing radiation.

3.1.19 *shallow dose equivalent (SDE), n*— dose equivalent delivered to the skin or an extremity at a tissue depth of 0.007 cm (7 mg/cm^2) averaged over an area of 1 square centimeter.

3.1.19.1 *Discussion*—DOE reporting requirements in 10 CFR 835.205 include provisions for assessing nonuniform exposures of the skin from X-rays, beta radiation, or radioactive materials on the skin, or a combination thereof. This assessment addresses affected skin areas of: ≥ 100 cm^2, < 100 cm^2 but ≥ 10 cm^2, and < 10 cm^2 with provisions for recording each.

3.1.20 *total effective dose equivalent (TEDE), n*—the sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

3.1.21 *transient worker, n*—a worker who has work assignments at two or more different nuclear facilities within one calendar year. This may or may not involve a change in employer.

3.1.22 *vital area, n*—an area of a nuclear facility that contains any equipment, system, or device, the failure or destruction of which could directly or indirectly endanger public health and safety by exposure to radiation.

3.1.23 *whole body dose, n*—includes the external deep dose to the head and trunk, active blood-forming organs, including gonads, and the elbows and arms above the elbow, or the knees and legs above the knee.

3.1.23.1 *Discussion*—The NRC (10CFR20.1003) includes the knees and elbows with the extremities.

4. Significance and Use

4.1 The standardization of nuclear facility transient worker records will provide the individual transient worker with a greater assurance that the radiation doses that may be received are within regulatory limits.

4.2 This specification establishes a fixed content for nuclear facility transient worker records. Standardizing the content of these records will facilitate interfacing with industry-wide record keeping systems, such as the Nuclear Energy Institute (NEI) Personnel Data System (PADS).

4.3 The standardization of nuclear facility transient worker records will reduce the time required for in-processing of these workers.

5. Content of Nuclear Facility Transient Worker Records—

5.1 The following format for recording dates to facilitate entry into electronic information systems is recommended: DDAAAYYYY (day—2 digits; month—3 alphabetic; year—4 digits).

5.2 *Worker Identification Data Element:*

5.2.1 Name—last, first, and middle initial, as applicable.

5.2.2 Identification code (such as a social security number or passport number).

5.2.3 Date of birth.

5.2.4 Permanent address.

5.2.5 Verification that the data contained in the worker's record have been reviewed by the worker and are complete to the best of the worker's knowledge as of the verification date.

5.2.6 Date of verification.

5.3 *Occupational External Radiation Exposure Data Elements:*

5.3.1 Current calendar year occupational external radiation exposure data element shall include the following information for each employer during the current calendar year (see Note 3):

5.3.1.1 Name of employer,

5.3.1.2 Address of employer,

5.3.1.3 Period of exposure (from - to),

5.3.1.4 Name and address of nuclear facility for the period of exposure (see 5.3.1.3),

5.3.1.5 Deep dose equivalent for the period of exposure (see 5.3.1.3),

5.3.1.6 Shallow dose equivalent for the skin of the whole body for the period of exposure (see 5.3.1.3 and 3.1.19),

5.3.1.7 Shallow dose equivalent for the skin of the extremity receiving the maximum dose for the period of exposure (see 5.3.1.3, 3.1.19, and 3.1.23),

5.3.1.8 Eye dose equivalent to the lens of the eye for the period of exposure (see 5.3.1.3), and

5.3.1.9 Total effective dose equivalent for the period of exposure (see 5.3.1.3).

5.3.1.10 For each of the doses identified in 5.3.1.5-5.3.1.9, specify whether the entry is an official record dose or an estimated dose.

5.3.2 At the end of the current calendar year the whole body dose information will be transferred to the lifetime radiation exposure history data element (see 5.5).

NOTE 3—The amount of worker external radiation exposure data that is kept on file at a nuclear facility greatly exceeds that required by data element 5.3.1 (for example, radiation type, dosimeter type, or dosimeter location on the body (see ANSI N13.6). This level of detail is not, however, required for records to be used for in-processing of transient workers.

5.4 *Occupational Internal Radiation Exposure Data Element:*

5.4.1 The committed dose equivalent (CDE) shall be determined for each organ affected by a radiation source located inside the body.

5.4.2 Data should be recorded to assist in the dose determination and should include, as a minimum, the following:

5.4.2.1 Radionuclide,

5.4.2.2 Inhalation class (if applicable),

5.4.2.3 Mode of intake,

5.4.2.4 Intake amount,

5.4.2.5 Date of intake, if known, and

5.4.2.6 Form of radionuclide (for example, oxide, metal, etc.).

5.5 *Lifetime Occupational Radiation Exposure History Data Element*—The data element shall include the following information for each employee (see Note 4 and Note 5):

5.5.1 Name of employer,

5.5.2 Address of employer,

5.5.3 Period of exposure (from - to),

5.5.4 Name and address of nuclear facility for the period of exposure (see 5.5.3),

5.5.5 Deep dose equivalent (DDE) for the period of exposure (see 5.5.3). For the deep dose equivalent, specify whether the entry is an official record dose or an estimated dose,

5.5.6 Shallow dose equivalent to the skin of the whole body for the period of exposure (see 5.5.3),

5.5.7 Shallow dose equivalent to the skin of the extremity receiving the maximum dose for the period of exposure (see 5.5.3),

5.5.8 Eye dose equivalent to the lens of the eye for the period of exposure (see 5.5.3),

5.5.9 Committed dose equivalent (CDE) for the maximally exposed organ during the period of exposure (see 5.5.3),

5.5.10 Committed effective dose equivalent (CEDE) for all internal exposures received during the period of exposure (see 5.5.3),

5.5.11 Total organ dose equivalent (TODE), which is the sum of deep dose equivalent (DDE) and committed dose equivalent (CDE), and

5.5.12 Total effective dose equivalent (TEDE), which is the sum of deep dose equivalent (DDE) and committed effective dose equivalent (CEDE).

NOTE 4—At both NRC licensed nuclear facilities and at DOE facilities, a worker is permitted to receive planned special exposure(s) in addition to the annual limits, provided the planned special exposure(s) would not cause an individual to receive additional doses in excess of applicable annual limits. The NRC further restricts such planned special exposures during the individual's lifetime. Records of the doses from planned special exposures shall be maintained in the individual's occupational exposure file.

NOTE 5—The information identified in 5.5 is not all of the information required on form NRC-4.

5.6 *Security Screening Data Element:*

5.6.1 Statement that the worker has or has not been screened for unescorted access to a nuclear facility (yes or no),

5.6.2 Date of security screening, and

5.6.3 Location of security screening records, including name and address of contact for auditing purposes.

5.7 *Medical Approval Data Element:*

5.7.1 Statement that the worker has or has not received a respirator use medical examination (yes or no),

5.7.2 Statement that the worker is or is not medically approved to use a respirator per NRC Regulatory Guide 8.15 and NUREG-0041 (yes or no),

5.7.3 Date of last medical evaluation for respirator use. A physician must determine that a worker is physically able to use respiratory protective equipment prior to the initial use of a respirator and either every 12 months thereafter or periodically at a frequency determined by a physician that the individual is medically fit (see paragraph 20.1703(a)(3)(v) of 10CFR Part 20) (see Note 6),

5.7.4 Name and title of person providing medical approval for respirator use, and

5.7.5 Location of medical evaluation records including name and address of contact for auditing purposes.

NOTE 6—The medical evaluation records must include a physician's signed statement that the worker is or is not medically approved to use a respirator.

5.8 *Radiation Worker Training Data Element:*

5.8.1 Statement that the worker has or has not satisfactorily completed a radiation worker training program (see Guide E1168),

5.8.2 Date of radiation worker training, and

5.8.3 Location of training records, including name and address of contact for auditing purposes.

6. Retention of Nuclear Facility Transient Worker Records

6.1 Records referenced in 5.2 through 5.8.3 may be beneficial in future defense litigation. Legal counsel of the employer, licensee, or insured, or combination thereof, should be consulted for determination of records retention periods.

6.2 Guidance provided in ANSI N13.6 and ANI/MAELU Information Bulletin 80-1A will assist in establishing appropriate records retention requirements.

7. Keywords

7.1 exposure history; in-processing data; personnel radiation worker data; radiation exposure; radiation worker; records retention; transient worker