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DRAFT REGULATORY GUIDE

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(Proposed Revision 4 of Regulatory Guide 8.7, dated November 2016)

INSTRUCTIONS FOR RECORDING AND REPORTING OCCUPATIONAL RADIATION DOSE DATA

A. INTRODUCTION

Purpose

This Regulatory Guide (RG) describes methods and procedures that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable for the preparation, retention, and reporting of occupational radiation doses, including the use of NRC Form 4, "Cumulative Occupational Dose History" (Ref. 1), and NRC Form 5, "Occupational Dose Record for a Monitoring Period" (Ref. 2).

Applicability

This RG applies to all NRC licensees (reactor and non-reactor) subject to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 20, "Standards for Protection Against Radiation" (Ref. 3).

Applicable Regulations

- 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations" (Ref. 4), Section 19.13, "Notifications and reports to individuals," requires each licensee to provide dose information to workers as shown in records maintained by the licensee pursuant to NRC regulations.
- 10 CFR 20.1003, "Definitions," defines the terms "exposure," "monitoring," "occupational dose," "planned special exposure," and "total effective dose equivalent" (TEDE).
- 10 CFR 20.1007, "Communications," provides methods of submitting required information to NRC.

- 10 CFR 20.1201, "Occupational dose limits for adults," requires licensees to control the occupational dose to individual adults to certain prescribed dose limits.

- 10 CFR 20.1206, "Planned special exposures," authorizes licensees to allow an adult worker to receive doses that are in addition to and accounted for separately from the doses received under the 10 CFR 20.1201 occupational dose limits, and prescribes the requirements the licensees must meet in allowing for such additional doses.

- 10 CFR 20.1502, "Conditions requiring individual monitoring of external and internal occupational dose," requires that licensees supply and require the use of individual monitoring devices by those individuals that the licensee has determined are likely to receive occupational doses exceeding those thresholds identified in 10 CFR 20.1502.

- 10 CFR 20.2104, "Determination of prior occupational dose," requires licensees to determine the dose in the current monitoring year for all persons who require monitoring under 10 CFR 20.1502. In addition, 10 CFR 20.2104(b) requires that, before permitting an individual to participate in a planned special exposure, licensees shall determine the internal and external doses from all previous planned special exposures and all doses in excess of the limits (including doses received during accidents and emergencies) received during the lifetime of the individual. Under 10 CFR 20.2104(d), licensees are required to record the exposure history of each individual on an NRC Form 4 or its equivalent.

- 10 CFR 20.2106, "Records of individual monitoring results," requires licensees to maintain records of doses received by all individuals for whom monitoring is required under 10 CFR 20.1502, and records of doses received during planned special exposures, accidents, and emergency conditions. Licensees shall make entries of the required records at least annually. Licensees shall maintain the required records on an NRC Form 5 or its equivalent.

- 10 CFR 20.2206, "Reports of individual monitoring," requires certain categories of licensees to submit to the NRC an annual report of the results of individual monitoring carried out by the licensee for each individual for whom monitoring was required by 10 CFR 20.1502 during that year. Licensees are required to record these annual reports on an NRC Form 5 or its equivalent.

Related Guidance

- RG 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses" (Ref. 5), provides guidance for monitoring and calculating an individual's occupational radiation dose.

- RG 8.40, "Methods for Measuring Effective Dose Equivalent from External Exposure," provides guidance for determining the effective dose equivalent (for external exposures) (EDEX) (Ref. 6).

Purpose of Regulatory Guides

The NRC issues RGs to describe to the public methods that the staff considers acceptable for use in implementing specific parts of the agency's regulations, to explain techniques that the staff uses in

evaluating specific problems or postulated events, and to provide guidance to applicants. RGs are not substitutes for regulations and compliance with RGs is not required. Methods and solutions that differ from those set forth in RGs will be deemed acceptable if they provide a basis for the findings required for the issuance or continuance of a permit or license by the Commission.

Paperwork Reduction Act

This RG references NRC Form 4 and Form 5, which are voluntary means for providing information required under 10 CFR Part 20. NRC Forms 4 and 5 and the associated 10 CFR Part 20 information collection requirements are all subject to the Paperwork Reduction Act of 1995 (44 U.S.C. § 3501 et. seq.). These information collections were approved by the Office of Management and Budget (OMB) under control numbers 3150-0005, 3150-0006, and 3150-0014 respectively. Send comments regarding this information collection, as described in this draft guide, to the Information Services Branch, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0014, 3150–0005, and 3150-0006) Office of Management and Budget, Washington, DC 20503.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

B. DISCUSSION

Reason for Revision

This revision of RG 8.7 (Revision 4) addresses issues that were identified after Revision 3 was issued. As a result, Revision 4 reinstates long-standing staff positions (as set forth in Revisions 1 and 2) for implementing the requirements of 10 CFR 20.1502, whereby in determining the need to monitor the occupational dose of a given individual, licensees are not required to consider the amount of prior occupational dose that individual received during the current monitoring year.

Background

The NRC amended the regulations in 10 CFR 20.1003 and 10 CFR 50.2 (Ref. 7) regarding the definition of the "total effective dose equivalent" (TEDE), which became effective on January 3, 2008 (72 FR 68043, "Occupational Dose Records, Labeling Containers, and the Total Effective Dose Equivalent," published on December 4, 2007) (Ref. 8). TEDE is defined as the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures). As a result of the revised definition of TEDE, the NRC staff now uses the additional acronym EDEX for the "effective dose equivalent" (for external exposures). Revision 3 to RG 8.7 included changes conforming to the amended regulations. In particular, the acronym EDEX is included in the revised NRC Forms 4 and 5 that were updated in 2015. Appendix A to this RG, "Format for Electronic Submittal of Dose Data," also includes the new acronym "EDEX."

Prior to the rulemaking discussed above, the definition of the TEDE was the sum of the deep-dose equivalent (DDE), to account for external exposure, and the committed effective dose equivalent (CEDE), to account for internal exposure. In accordance with the December 4, 2007 rulemaking, TEDE was redefined as the sum of the effective dose equivalent for external exposures (i.e., EDEX) and the committed effective dose equivalent for internal exposures (i.e., CEDE). Essentially, the December 4, 2007 rulemaking replaced the DDE with the EDEX.

Old definition: TEDE = DDE + CEDE

New definition: TEDE = EDEX + CEDE

The revised TEDE definition also affected the format of NRC Forms 4 and 5 because the EDEX is now a quantity to be determined and recorded when monitoring external dose. Therefore, Revision 4 discusses the revised Forms 4 and 5, which incorporate the EDEX quantity, and provides instructions on the summation of the EDEX and CEDE to determine the TEDE.

Also, the term "total organ dose equivalent" (TODE) is included in the revised NRC Form 4 and 5 to denote the sum of the DDE and the committed dose equivalent (CDE) to the organ receiving the highest dose, to be consistent with the regulations described in 10 CFR 20.2106(a)(6).[1] Although this regulation does not include the acronym TODE, the acronym is used by NRC staff to denote "total organ dose equivalent."

NRC Forms 4 and 5 are available electronically and can be found on the Radiation Exposure Information and Reporting System (REIRS) website at http://www.reirs.com. Also, NRC Forms 4 and 5

[1] NRC staff interprets the phrase "committed dose to the organ" in 10 CFR 20.2106(a)(6) to mean the committed dose equivalent (CDE), as defined in 10 CFR 20.1003.

are available through the NRC's public website (under NRC Library/Document Collections/Forms) at https://www.nrc.gov/reading-rm/doc-collections/forms/.

Harmonization with International Standards

The NRC staff reviewed the guidance from the International Atomic Energy Agency (IAEA), International Organization for Standardization (ISO), and the International Commission on Radiological Protection (ICRP) and did not identify guidance that is relevant to satisfying specific NRC requirements regarding recording and reporting of occupational radiation dose data.

C. STAFF REGULATORY GUIDANCE

This section provides detailed descriptions of the methods, approaches, or data that the NRC staff considers acceptable for meeting the requirements of the regulations cited in the Introduction.

1. Determining the Need to Monitor

Licensees are required under 10 CFR 20.1502 to monitor exposures to radiation and radioactive materials at levels sufficient to demonstrate compliance with the occupational dose limits of 10 CFR Part 20. According to 10 CFR 20.1502(a), as a minimum, each licensee shall monitor occupational exposure to radiation from licensed and unlicensed radiation sources external to the body under the control of the licensee for the following four categories of individuals:

1) Adults likely to receive, in one year, from radiation sources external to the body, a dose in excess of 10 percent of the limits in 10 CFR 20.1201(a);

2) Minors likely to receive, in one year, from radiation sources external to the body, a deep dose equivalent in excess of 0.1 rem (1 millisievert (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);

3) 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)[2]; and

4) Individuals entering a high or very high radiation area.

According to 10 CFR 20.1502(b), as a minimum, each licensee shall monitor the occupational intake of radioactive material by and assess the committed effective dose equivalent to the following three categories of individuals:

1) Adults likely to receive, in 1 year, an intake in excess of 10% of the applicable annual limit on intake (ALI) in table 1, columns 1 and 2, of appendix B to 10 CFR Part 20;

2) Minors likely to receive, in 1 year, a committed effective dose equivalent in excess of 0.1 rem (1 mSv); and

3) Declared pregnant women likely to receive, during the entire pregnancy, a committed effective dose equivalent in excess of 0.1 rem (1 mSv).

The licensee should evaluate the dose that individuals are likely to receive before allowing them to receive the dose (i.e., perform a prospective dose evaluation). The licensee need not perform a prospective dose evaluation for every individual; evaluations can be performed for individuals with similar job functions or work areas. Regulatory Guide 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses," provides further guidance in determining the need to monitor an individual's occupational radiation dose.

[2] All of the occupational dose limits in 10 CFR 20.1201 continue to be applicable to the declared pregnant woman as long as the embryo/fetus dose limit is not exceeded. See RG 8.36, "Radiation Dose to the Embryo/Fetus."

For individuals who received an occupational dose at other licensed facilities in the current year, the previous dose does not need to be considered in the prospective dose evaluation. Only the dose that could be received at the facility performing the evaluation should be considered when determining the need for monitoring. However, once a licensee has determined to monitor the occupational dose for a given individual, the licensee must meet the requirement of 10 CFR 20.1201(f) to reduce the dose that the individual may be allowed to receive in the current monitoring year by the amount of occupational dose the individual received while employed by any other person.

1.1 If Monitoring Is Not Required

If the prospective dose evaluation shows that an individual is not likely to receive a dose in a year that exceeds the monitoring criteria set forth in 10 CFR 20.1502, the licensee is not required to monitor the individual's dose, to keep records, or report the individual's dose. If monitoring of the occupational intake of radioactive material and assessment of the CEDE is not being performed, then licensee evaluations of subsequent minor intakes that were anticipated based on the prospective dose evaluation or pre-job evaluations is not required monitoring. However, dose assessments performed to quantify unanticipated intakes or exposures are considered required monitoring, regardless of the magnitude of the resulting doses, and results must recorded and reported accordingly.

If the licensee determines that monitoring is not required and a subsequent evaluation shows that the individual exceeded (or was likely to have exceeded) the monitoring limit threshold, the licensee should estimate, record, and report the dose received when monitoring was not provided. These estimates can be based on any combination of work location radiation monitoring or survey results, monitoring results of individuals in similar work situations, or other estimates to produce a "best estimate" of the actual dose received.

If the prospective dose evaluation concludes that monitoring of one or more dose quantities is not required (e.g., CDE and CEDE), the licensee should enter "NR" for "Not Required" in the blocks on NRC Forms 4 and 5.

1.2 If Monitoring Is Required

If the prospective dose evaluation shows that an individual is likely to receive, during the current monitoring year, a dose that exceeds the monitoring criteria set forth in 10 CFR 20.1502, then the licensee must perform monitoring. Licensees, however, are not required to speculate upon future occupational doses that individuals might receive while employed by any other person. In addition, 10 CFR 20.2106(a) requires that licensees maintain records of doses received by all individuals from whom monitoring was required pursuant to 10 CFR 20.1502. The licensee shall maintain such records on NRC Form 5. Section 20.2206(b) requires certain categories of licensees to annually report their 10 CFR 20.1502 monitoring results, using NRC Form 5, to the Radiation Exposure Information and Reporting System (REIRS) Project Manager, regardless of the actual dose received (even if the actual dose received is less than the dose criteria for which monitoring is required). In addition, 10 CFR 19.13, "Notifications and Reports to Individuals" requires licensees to provide certain annual radiation exposure data to monitored individuals. Where monitoring was provided but the dose was not measurable, the licensee should enter "ND" for "Not Detectable" in the blocks on NRC Forms 4 and 5.

1.3 Documentation of Prior Doses

For those individuals for whom monitoring is required under 10 CFR 20.1502, the licensee shall determine the individual's current year dose as required by 10 CFR 20.2104(a). In accordance with 10 CFR 20.1201(f), the licensee shall reduce the dose that an individual may be allowed to receive in the

current monitoring year by the amount of occupational dose the individual received while employed by any other person.

In addition, before permitting an individual to participate in a planned special exposure, 10 CFR 20.2104(b) requires licensees to determine the internal and external doses from all previous planned special exposures and all doses in excess of the limits (including doses received during accidents and emergencies) received during the lifetime of the individual.

In order to comply with 10 CFR 20.1201(f) and 10 CFR 20.2104(a) and (b), the licensee may:

1) Accept as a record of the occupational dose that the individual received during the current year, a written signed statement from the individual or from the individuals most recent employer for work involving radiation exposure, that discloses the nature and the amount of any occupational dose that the individual may have received during the current year;

2) Accept as the record of cumulative radiation dose, an up-to-date NRC Form 4 or equivalent, signed by the individual and countersigned by an appropriate official of the most recent employer for work involving radiation exposure, or the individual's current employer (if the individual is not employed by the licensee); and

3) Obtain reports of the individual's dose equivalents from the individual's most recent employer for work involving radiation exposure, or the individual's current employer (if the individual is not employed by the licensee) by telephone, electronic media or letter. The licensee shall request a written verification of the dose data received by such methods if the authenticity of the transmitted report cannot be established in accordance with 10 CFR 20.2104(c)(3).

NRC Forms 4 and 5 are revised periodically, and require OMB review and approval. Licensees are not required to, and should not, revise, retrospectively, historical dose records to reflect the content or format of the currently approved versions of the forms. NRC Forms 4 and 5, termination letters, or reports that document the results of monitoring performed before implementation of the 1991 revision of 10 CFR Part 20, may be used without recalculating doses, according to the requirements of the 1991 revision of 10 CFR Part 20. For the purpose of assessing doses prior to 1981, whole body doses, in rem, as reported in the old NRC Forms 4 and 5 (from 1981 or earlier) can be considered equivalent to TEDE.

1.4 Obtaining Records of Prior Doses for Persons Participating in Planned Special Exposures

Regulatory Guide 8.35, "Planned Special Exposures" (Ref. 9), provides further guidance on planning and controlling planned special exposures. Acceptable documentation of prior exposure is similar to that required to document current year exposure. The licensee may ask the NRC to provide a report of the monitored individual's exposure history, by submitting a request via the NRC's Radiation Exposure Information and Reporting System (REIRS) using the secure web link available at http://www.reirs.com." Alternatively, the licensee may send a request signed by the monitored individual to the following point of contact:

REIRS Project Manager
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Each request should contain the Social Security number (or other unique identifier) of the monitored individual authorizing release of the information and the name and address of the person or licensee to whom the report should be sent. The NRC's REIRS database contains copies of all licensee exposure records submitted to the NRC. However, the database contains only reports submitted by the seven classes of licensees that are required under 10 CFR 20.2206 to submit an annual report of the results of individual monitoring in accordance with 10 CFR 20.1502. Any missing monitoring periods should be obtained directly from licensees or other non-NRC-licensed facilities (e.g., Agreement States, U.S. Department of Energy or U.S. Department of Defense facilities).

1.5 Use of ID Types Other than Social Security Number

Doses to individuals who do not have a Social Security number, such as citizens of foreign countries, and individuals who are either unwilling or unable to provide (cannot locate or do not want to disclose) a Social Security number, should be reported using another unique identifier. It is important to record the type of identification in the data block labeled "ID Type," which follows the "Identification Number" data block on NRC Forms 4 and 5. The instructions on the back of these forms define all valid ID types. Licensees should insert the appropriate code (listed below) in the blank labeled "ID Type."

ID TYPE	CODE
U.S. Social Security Number	SSN
Passport Number	PPN
Canadian Social Insurance Number	CSI
Work Permit Number	WPN
PADS Identification Number	PAD
Other	OTH

The use of licensee-generated identification numbers should be avoided whenever possible.

2. Recording, Maintaining and Reporting of Monitoring Results for Individuals for Whom Monitoring Is Required

2.1 Recording and Maintaining Dose Data

The regulations in 10 CFR 20.2106 require licensees to maintain records of doses received by all individuals for whom monitoring was required pursuant to 10 CFR 20.1502, and records of doses received during planned special exposures, accidents, and emergency conditions. Licensees should maintain dose records on NRC Form 5, in accordance with the instructions for NRC Form 5, or in clear and legible records containing all the information required by NRC Form 5.

2.2 Single Dosimeter

In uniform radiation fields, the exposure over the various parts of the body is sufficiently uniform such that placing one dosimeter on the chest area is sufficient to comply with dose monitoring

requirements. The EDEX is equal to the DDE measured by the single dosimeter. In this case, the same numerical value will be reported in both Blocks 11a (EDEX) and 11b (DDE) of NRC Form 4 and Form 5.

In non-uniform radiation fields, different parts of the body will receive different levels of radiation exposure. If it is known which part of the body will receive the highest exposure, then one dosimeter placed at that location will satisfy monitoring requirements.

2.3 Multiple Dosimeters

If it is not known which part of the body will receive the highest exposure, a licensee can use multiple dosimeters and report the highest measured dose. In this case, the EDEX is numerically equal to the highest measured DDE.

If a licensee chooses to more accurately assess the EDEX, a licensee can use a dosimetry method approved by the NRC to determine the EDEX. Regulatory Guide 8.40 describes several methods approved by the NRC in which one or more dosimeters may be placed on specified locations on the body, and an algorithm is used to combine the dosimeter readings to determine the EDEX. This approach is expected to provide a more accurate and less conservative estimate of EDEX than by measuring the highest DDE, but it is also more complex and must be used with caution and close attention to the placement of the dosimetry.

The recording of the EDEX in Block 11a and the DDE in Block 11b should be performed as follows:

- If a single dosimeter is used to measure the EDEX (and the DDE) throughout the monitoring period, the same numerical value is recorded in Block 11a and Block 11b.

- If a single dosimeter is used to measure the EDEX (and the DDE) for part of the year, and multiple dosimeters are used to measure the EDEX for the remainder of the year (using a dosimetry method approved by the NRC), then the numerical value of the EDEX recorded in Block 11a is the sum of the EDEX for the first part of the year (based on the single dosimeter) plus the EDEX from the remainder of the year (based on the dosimetry method approved by the NRC). The numerical value of the DDE recorded in Block 11b is the sum of the DDE for the first part of the year (based on the single dosimeter) plus the highest DDE from any of the multiple dosimeters from the remainder of the year.

2.4 Dose Calculations for CDE and TODE to the Maximally Exposed Organ

As required by 10 CFR 20.2106(a)(6), when monitoring is required by 10 CFR 20.1502, licensees shall record, when applicable, the TODE, which is the sum of the DDE and the CDE, to the organ receiving the highest dose (the maximally exposed organ). Organ doses need not be calculated if the CEDE does not exceed 1 rem (10 mSv)[3] and the DDE does not exceed 5 rem (50 mSv), including intakes and doses previously reported by other licensees. This is because the CEDE and DDE monitoring is sufficient to demonstrate that the TODE limit has not been exceeded.

In cases where the CDE is not required to be determined and is therefore not calculated, the licensee should record "NC" for "not calculated" in items 16 (CDE) and 18 (TODE) on NRC Forms 4 and

3 The value of 1 rem (10 mSv) is based on the most limiting tissue weighting factor (i.e., the weighting factor for the thyroid tissue or bone surface) of 0.03. Therefore, 1 rem (10 mSv) divided by a thyroid weighting factor of 0.03 results in a CDE of 33.3 rem (333 mSv). A CDE value of 33.3 rem (333 mSv), when added to an assumed 5 rem (50 mSv) DDE value, is less than the CDE limit of 50 rem (500 mSv).

5. It should be noted that "NC" is only appropriate for the CDE and TODE. "NC" should not be used for other dose values on NRC Form 4 and Form 5. If the licensee is not required to determine the CDE and TODE, but voluntarily determines these values, the license may report these values in blocks 16 and 18.

If during the course of the year, the CEDE for the year exceeds 1 rem (10 mSv), or the individual receives a DDE in excess of 5 rem (50 mSv), then the licensee is required to calculate, record, and report the CDE and TODE to the maximally exposed organ. RG 8.34 provides added guidance on calculating CDE and TODE.

2.5 Dose to the Embryo/Fetus

A declared pregnant woman is an occupational worker who has voluntarily informed her employer (in writing) of her pregnancy and the estimated month and year of conception. In such instances, the licensee shall maintain the record of the dose to the embryo/fetus with the records of dose to the declared pregnant woman per 10 CFR 20.2106(e); however, the dose to the embryo/fetus need not be recorded on NRC Forms 4 or 5. Multiple records are not required in the case of multiple births (twins, triplets, etc.). Licensees shall maintain the records of dose to an embryo/fetus with the records of dose to the declared pregnant woman. Licensees are required to record any dose measured to demonstrate compliance with 10 CFR 20.1208, "Dose Equivalent to an Embryo/Fetus."

Records of dose to the embryo/fetus should be protected from public disclosure because of their personal privacy nature. If requested by the declared pregnant woman, a letter report may be provided to subsequent licensees to document prior embryo/fetus dose. Regulatory Guide 8.36, "Radiation Dose to the Embryo/Fetus" (Ref. 10), provides further guidance on assessing the dose to the embryo/fetus.

2.6 Preferred Units

The preferred unit of dose is the "rem." The preferred unit for intakes is the microcurie (μCi). The licensee may record quantities in the international system (SI) units in parentheses following each of the preferred units. For the electronic submittal of dose data described in Appendix A, the dose and intake values should be given in units of rem and μCi.

2.7 Round-Off of Doses

Licensees should round doses to the nearest 0.001 rem (0.01 mSv) on NRC Forms 4 and 5. Therefore, a dose of "0.006192" should be entered as "0.006 rem," and a value of "0.000291" should be entered as "0 rem." When the dose is monitored but not detected, the licensee should enter "ND" for "Not Detectable."

2.8 Reporting Dose Data to the NRC

As required by 10 CFR 20.2206(c), designated licensees shall submit reports of monitoring for the previous year to the NRC on or before April 30 of each year. As directed by 10 CFR 20.2206(b), licensees shall use "Form NRC 5 or electronic media containing all the information required by Form NRC 5." NRC Form 5 provides instructions and other information pertinent to each item.

As stated in 10 CFR 20.2206(c), licensees shall submit their reports to the REIRS Project Manager or alternatively, via the REIRS website at http://www.reirs.com.

Licensees who choose to submit their reports to the REIRS Project Manager may use the following methods, as stated in 10 CFR 20.1007:

- By mail to U.S. Nuclear Regulatory Commission, Washington DC 20555-0001,

- By hand delivery to:

  Office of Information Services
  U.S. Nuclear Regulatory Commission
  11555 Rockville Pike, Rockville, MD 20852-2738

- By electronic submission, for example via Electronic Information Exchange or CD-ROM, or REIRS website (http://www.reirs.com), which is a secure method for submitting dose data files.

Note: The use of CD-ROM is not the preferable method for submitting data to the NRC since the NRC staff has experienced frequent damaging of the CD-ROMs during mailing distribution which made these devices inoperable for retrieving stored information. In addition, the licensee must meet all applicable requirements for the protection of personally identifiable information (PII). Licensees should not send dose data containing PII via email or on any removable electronic media (e.g., CD-ROM or flash drive) that does not meet all applicable PII protection laws and regulations.

2.8.1 Electronic Submission of Dose Data for Groups or Individuals

Licensees (especially those with a large number of monitored individuals) are encouraged to record and report these data electronically, because manual entry of individual data in the REIRS website can introduce errors.

Appendix A to this guide provides guidance for reporting radiation dose data to the NRC in an electronic, machine-readable format.

D. IMPLEMENTATION

The purpose of this section is to provide information on how applicants and licensees subject to 10 CFR Part 20 may use this guide and information regarding the NRC's plans for using this regulatory guide.

Use by Applicants and Licensees

Applicants and licensees may voluntarily use the guidance in this document to demonstrate compliance with the underlying NRC regulations. Methods or solutions that differ from those described or referenced in this regulatory guide may be deemed acceptable if they provide sufficient basis and information for the NRC staff to verify that the proposed alternative demonstrates compliance with the appropriate NRC regulations.

Licensees may use the information in this regulatory guide for actions that do not require NRC review and approval. Licensees may use the information in this regulatory guide or applicable parts to resolve regulatory or inspection issues.

Use by NRC Staff

The NRC staff does not intend or approve any imposition of the guidance in this regulatory guide. The NRC staff does not expect any existing licensee to use or commit to using the guidance in this regulatory guide, unless the licensee makes a change to its licensing basis. The NRC staff does not expect or plan to request licensees to voluntarily adopt this regulatory guide to resolve a generic regulatory issue. The NRC staff does not expect or plan to initiate NRC regulatory action that would require the use of this regulatory guide. Examples of such unplanned NRC regulatory actions include issuance of an order, generic communication, or rule requiring the use of this regulatory guide.

The staff may discuss with licensees various actions consistent with staff positions in this regulatory guide, as one acceptable means of meeting the underlying NRC regulatory requirement. However, unless this regulatory guide is part of the licensing basis for a facility, the staff may not represent to the licensee that the licensee's failure to comply with the positions in this regulatory guide constitutes a violation.

If an existing licensee voluntarily seeks a license amendment or change and (1) the NRC staff's consideration of the request involves a regulatory issue directly relevant to this regulatory guide, and (2) the specific subject matter of this regulatory guide is an essential consideration in the staff's determination of the acceptability of the licensee's request, then the staff may request that the licensee either follow the guidance in this regulatory guide or provide an equivalent alternative process that demonstrates compliance with the underlying NRC regulatory requirements.

REFERENCES[4]

1. U.S. Nuclear Regulatory Commission (NRC) Form 4, "Cumulative Occupational Dose History," Washington, DC.

2. NRC Form 5, "Occupational Dose Record for a Monitoring Period," Washington, DC.

3. *U.S. Code of Federal Regulations* (CFR), "Standards for Protection against Radiation," Part 20, Chapter I, Title 10, "Energy" (10 CFR Part 20), Washington, DC.

4. CFR, "Notices, Instructions and Reports to Workers: Inspection and Investigations," Part 19, Chapter I, Title 10, "Energy" (10 CFR Part 19) Washington, DC.

5. NRC, Regulatory Guide (RG) 8.34, "Monitoring Criteria and Methods To Calculate Occupational Radiation Doses," Washington, DC.

6. NRC, RG 8.40, "Methods for Measuring Effective Dose Equivalent from External Exposure," Washington, DC.

7. CFR, "Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy" (10 CFR Part 50), Washington, DC.

8. NRC, "Occupational Dose Records, Labeling Containers, and the Total Effective Dose Equivalent," *Federal Register*, Vol. 72, No. 232, December 4, 2007, pp. 68043–68059 (72 FR 68043).

9. NRC, RG 8.35, "Planned Special Exposures," Washington, DC.

10. NRC, RG 8.36, "Radiation Dose to the Embryo/Fetus," Washington, DC.

4 Publicly available NRC-published documents are available online through the NRC Library on the NRC's public website at http://www.nrc.gov/reading-rm/doc-collections/. The documents can also be viewed online or printed for a fee in the NRC's Public Document Room (PDR) at 11555 Rockville Pike, Rockville, MD; the mailing address is USNRC PDR, Washington, DC 20555; telephone 301-415-4737 or (800) 397-4209; fax (301) 415-3548; and e-mail pdr.resource@nrc.gov.

APPENDIX A

FORMAT FOR ELECTRONIC SUBMITTAL OF DOSE DATA

Introduction

This appendix outlines a means by which licensees may satisfy the requirement to record the exposure history of each individual, set forth in 10 CFR 20.2104, "Determination of Prior Occupational Dose," and the annual reporting requirements of 10 CFR 20.2206, "Reports of Individual Monitoring." Where practicable, for satisfying the 10 CFR 20.2206 annual reporting requirement, the U.S. Nuclear Regulatory Commission (NRC) prefers to have licensees submit an electronic file via the Radiation Exposure Information and Reporting System (REIRS) using the secure web link available at http://www.reirs.com." Regardless of submittal method, licensees who have their exposure records in an electronic format are encouraged to submit electronic files. This is especially important for those licensees who have a large number of monitored individuals, because manual data entry is inefficient and can introduce an additional source of error.

Media Requirements

If the secure website submittal process is not used, other data submission formats may also be acceptable. Upon request, the NRC REIRS project manager will provide additional guidance to licensees in order for them to submit records on electronic media.

Transmittal Letters

Licensees should submit a transmittal letter containing information that will minimize processing time and help resolve possible discrepancies. Each letter should contain the following information (as a minimum):

- File name — descriptive name of the file(s),
- Date created — date each file was created,
- Operating system — operating system and version used to generate the data file,
- Contact — name and telephone number of the cognizant point of contact,
- Other instructions — comments or explanation regarding the data format, or other important information regarding the data file,
- Signature and date — dated signature of the licensee's authorized representative responsible for the data, and
- Other information — Licensees are encouraged to include additional information, such as a change in operational status, radiation protection, or monitoring practices that may affect occupational radiation exposure and may be useful to the NRC in evaluating or assessing the annual submittal.

Expected Data

Each licensee is expected to submit at least one NRC Form 5 for each monitored individual at the given facility for each monitoring year. Licensees may also submit an NRC Form 5 for planned special exposures for individuals, if planned special exposures were authorized. Licensees should include the primary license number on each submitted NRC Form 5 to ensure that the records are assigned to the proper facility.

File Structure

The file structure consists of a header record, which provides information about the source of the data file, followed by NRC Form 5 dose records and supporting NRC Form 5 intake records. Where applicable, the file may also include one or more NRC Form 5 comment records to explain special exposure calculations or exposures in excess of regulatory limits. Each record contains only American Standard Code for Information Interchange or Extended Binary Coded Decimal Interchange Code printable characters and is terminated with a carriage return and a line feed. All empty space in a field is padded with spaces.

Header Record

The header record occurs only once at the top of each file to identify the source of the data.

Field	Width	Start Col.	End Col.	Description
Primary_License	13	1	13	Primary NRC license number
Version	10	15	24	Version of Regulatory Guide 8.7 in effect at the time of this submittal, formatted as "RG 8.7, Rev. 4"
Preparation_Date	8	26	33	Date the record was written to the data file, formatted as "YYYYMMDD"
Licensee_Name	72	35	106	Name of NRC licensee
Contact	72	108	179	Name of person to contact for further information about this data file
Phone_Number	14	181	194	Contact's phone number
Other_License_1	13	196	208	Other related NRC license number
Other_License_2	13	210	222	Other related NRC license number
Other_License_3	13	224	236	Other related NRC license number
Other_License_4	13	238	250	Other related NRC license number
Other_License_5	13	252	264	Other related NRC license number
Other_License_6	13	266	278	Other related NRC license number
Other_License_7	13	280	292	Other related NRC license number
Other_License_8	13	294	306	Other related NRC license number
Other_License_9	13	308	320	Other related NRC license number
Other_License_10	13	322	334	Other related NRC license number

NRC Form 5 Dose Record

The data file contains one dose record for each NRC Form 5 being reported. Each dose record may be followed by zero or more NRC Form 5 intake records.

Field	Width	Start Col.	End Col.	Description
Employee_ID	12	1	12	SSN, PPN, CSI, WPN, PAD, or OTH (IDs should have no punctuation.)
ID_Type	3	14	16	"SSN," "PPN," "CSI," "WPN," "PAD," or "OTH"
Primary_License	13	18	30	Primary NRC license number
Preparation_Date	8	32	39	Date the record was written to the data file, formatted as "YYYYMMDD"
Record_Type	1	41	41	"D" = DOSE
First_Name	25	43	67	Employee's full first name (no nicknames)
Middle_Initial	1	69	69	Employee's middle initial
Last_Name	25	71	95	Employee's last name (Titles such as "Jr" should be separated from the last name by a space, without any punctuation.)
Sex	1	97	97	Employee's sex "M" = Male and "F" = Female
Birth_Date	8	99	106	Employee's date of birth, formatted as "YYYYMMDD"
Monitoring_Start	8	108	115	Date monitoring began, formatted as "YYYYMMDD" (This typically is January 1 of the monitoring year for everyone except new hires.)
Monitoring_End	8	117	124	Date monitoring ended, formatted as "YYYYMMDD" (This typically is December 31 of the monitoring year for everyone except terminations.)
Report_Type	1	126	126	"R" = Record, or "E" = Estimate
Exposure_Type	1	128	128	"R" = Routine, or "P" = PSE
EDEX	8	130	137	Effective dose equivalent from external sources for the entire monitoring period in rem, formatted as "999.999"
DDE	8	139	146	Deep dose equivalent for the entire monitoring period in rem, formatted as "999.999"
LDE	8	148	155	Eye dose equivalent to the lens of the eye in rem, formatted as "999.999"
SDE_WB	8	157	164	Shallow dose equivalent, whole body in rem, formatted as "999.999"
SDE_ME	8	166	173	Shallow dose equivalent, max extremity in rem, formatted as "999.999"
CEDE	8	175	182	Committed effective dose equivalent in rem, formatted as "999.999"
CDE	8	184	191	Committed dose equivalent in rem, formatted as "999.999"
TEDE	8	193	200	Total effective dose equivalent in rem, formatted as "999.999." The sum of EDEX and CEDE.
TODE	8	202	209	Total organ dose equivalent, maximally exposed organ in rem, formatted as "999.999." The sum of DDE and CDE.

Form 5 Intake Record

The data file should include an intake record for each intake on the NRC Form 5 being reported.

Field	Width	Start Col.	End Col.	Description
Employee ID	12	1	12	SSN, PPN, CSI, WPN, PAD, or OTH (IDs should have no punctuation.)
ID_Type	3	14	16	"SSN," "PPN," "CSI," "WPN," "PAD," or "OTH"
Primary_License	13	18	30	Primary NRC license number
Preparation_Date	8	32	39	This is the date from the parent **NRC Form 5 Dose Record**, formatted as "YYYYMMDD"
Record_Type	1	41	41	"I" = Intake
Radionuclide	9	43	51	Radionuclide abbreviation with the hyphen (e.g., U-234)
Class	1	53	53	Enter the pulmonary clearance class designator for inhalation mode. "D," "Y," "W," "V," "F," "M," "S," or "O" for Other. If the intake mode is not inhalation, enter the abbreviation for the intake mode here, as well as in the Mode column.
Mode	1	55	55	"H" = Inhalation, "B" = Absorption, "J" = Injection, or "G" = Ingestion
Intake	10	57	66	The amount of μCi for the radionuclide (This can be expressed in scientific notation using the format "+9.999E+99" or as a decimal number of fewer than 9 digits.)

Form 5 Comment Record

The data file only includes this record type when comments are necessary to explain special exposure calculations or overexposures.

Field	Width	Start Col.	End Col.	Description
Employee_ID	12	1	12	SSN, PPN, CSI, WPN, PAD, or OTH (IDs should have no punctuation.)
ID_Type	3	14	16	"SSN," "PPN," "CSI," "WPN," "PAD," or "OTH"
Primary_License	13	18	30	Primary NRC license number
Preparation_Date	8	32	39	This is the date from the parent **NRC Form 5 Dose Record**, formatted as "YYYYMMDD"
Record_Type	1	41	41	"C" = Comment
Comment	240	43	282	Explanatory comment (when needed)