391-3-17-25.03 STANDARDS FOR PROTECTION AGAINST RADIATION. AMENDED.

(1) General Provisions

(a) Purpose.

This Rule, 391-3-17-.03, establishes standards for protection against ionizing radiation resulting from activities conducted pursuant to licenses issued by the Department. The requirements in this Rule are designed to control the receipt, possession, use, transfer, and disposal of sources of radiation by any licensee so that the total dose to an individual, including doses resulting from all sources of radiation other than background radiation, does not exceed the standards for protection against radiation prescribed in this Rule. However, nothing in this Rule shall be construed as limiting actions that may be necessary to protect health and safety.

(b) Scope.

This Rule applies to persons licensed by the Department on or after January 1, 1994, to receive, possess, use, transfer, or dispose of sources of radiation. The limits in this Rule do not apply to doses due to background radiation, to exposure of patients to radiation for the purpose of medical diagnosis or therapy, or to voluntary participation in medical research programs.

(2) Definitions

The definitions set forth for certain terms under 391-3-17-.01 are applicable to those terms as used in this Rule, unless the term is otherwise defined herein. As used in this Rule:

(a) "Air-purifying respirator" means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

(b) "Assigned protection factor" (APF) means the expected workplace level of respiratory protection that would be provided by a properly functioning respirator or a class of respirators to properly fitted and trained users. Operationally, the inhaled concentration can be estimated by dividing the ambient airborne concentration by the APF.

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(c) "Atmosphere-supplying respirator" means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

(ad) "Annual limit on intake" (ALI) means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of ~~5~~ five rem (0.05 Sv) or a committed dose equivalent of 50 rem (0.5 Sv) to any individual organ or tissue. ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table I, Columns 1 and 2, of Appendix B to 10 CFR 20~~.1001-20.2401, effective January 1, 1994~~, exclusive of subsequent amendments or editions.

(be) "Chelating agent" has the same meaning as that given in Rule 391-3-17-.01(2)(r).

(cf) "Chemical description" means a description of the principal chemical characteristics of a low-level radioactive waste.

(dg) "Class" means a classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W, or Y, which apply to a range of clearance half-times: for Class D (Days), of less than ~~10~~ ten days; for Class W (Weeks), from ~~10~~ ten to 100 days; and for Class Y (Years), of greater than 100 days. For purposes of this Chapter, "lung class" and "inhalation class" are equivalent terms.

(eh) "Computer-readable medium" means that the Department's computer can transfer the information from the medium into its memory.

(fi) "Consignee" means the designated receiver of the shipment of low-level radioactive waste.

(j) "Constraint (dose equivalent)" means a value above which specified licensee actions are required.

(k) "Critical Group" means the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances.

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(~~g~~l) "Declared pregnant woman" means any woman who has voluntarily informed ~~her employer~~ the licensee, 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.

(m) "Decommission" means to remove a facility or site safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license.

(~~h~~n) "Decontamination facility" means a facility operating under a Department, U.S. Nuclear Regulatory Commission, Agreement State or Licensing State license whose principal purpose is decontamination of equipment or materials to accomplish recycle, reuse, or other waste management objectives, and, for purposes of this part, is not considered to be a consignee for LLW shipments.

(o) "Demand respirator" means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

(~~i~~p) "Derived air concentration" (DAC) means the concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2000 hours under conditions of light work (inhalation rate of 1.2 cubic meters of air per hour), results in an intake of one ALI. DAC values are given in Table I, Column 3 of Appendix B to 10 CFR 20.~~1001-20.2402.~~

(~~j~~q) "Derived air concentration-hour" (DAC-hour) means the product of the concentration of radioactive material in air, expressed as a fraction or multiple of the derived air concentration for each radionuclide, and the time of exposure to that radionuclide, in hours. A licensee may take 2,000 DAC-hours to represent one ALI, equivalent to a committed effective dose equivalent of ~~5~~ five rem (0.05 Sv).

(r) "Disposable respirator" means a respirator for which maintenance is not intended and that is designed to be discarded after excessive breathing resistance, sorbent exhaustion, physical damage, or end-of-service-life renders it unsuitable for use. Examples of this type of respirator are a disposable half-mask respirator or a disposable escape-only self-contained breathing apparatus (SCBA).

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(~~ks~~) "Disposal container" means a container principally used to confine low-level radioactive waste during disposal operations at a land disposal facility (also see "high integrity container"). Note that for some shipments, the disposal container may be the transport package.

(t) "Distinguishable from background" means that the detectable concentration of a radionuclide is statistically different from the background concentration of that radionuclide in the vicinity of the site or, in the case of structures, in similar materials using adequate measurement technology, survey, and statistical techniques.

(~~lu~~) "Dosimetry processor" means a person that processes and evaluates individual monitoring equipment devices in order to determine the radiation dose delivered to the monitoring devices.

(~~mv~~) "EPA identification number" means the number received by a transporter following application to the Administrator of EPA as required by 40 CFR part 263.

(w) "Filtering facepiece" (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium, not equipped with elastomeric sealing surfaces and adjustable straps.

(x) "Fit factor" means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

(y) "Fit test" means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

(~~nz~~) "Generator" means a licensee operating under a Department, U.S. Nuclear Regulatory Commission or Agreement State license who (1) is a waste generator as defined in (2)(ff), or (2) is the licensee to whom waste can be attributed within the context of the Low-Level Radioactive Waste Policy Amendments Act of 1985 (e.g., waste generated as a result of decontamination or recycle activities).

(aa) Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

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(ebb) "High integrity container (HIC)" means a container commonly designed to meet the structural stability requirements of Rule 391-3-17-.03(12)(g), and to meet Department of Transportation requirements for a Type A package.

(cc) "Hood" means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

(ddd) "Land disposal facility" means the land, buildings and structures, and equipment which are intended to be used for the disposal of radioactive waste. For purposes of this Rule, a "geologic repository" as defined in 10 CFR Part 60 is not considered a "land disposal facility."

(ee) "Lens dose equivalent" (LDE) has the same meaning as that given in Rule 391-3-17-.01(2)(yy).

(ff) "Loose-fitting facepiece" means a respiratory inlet covering that is designed to form a partial seal with the face.

(gg) "Negative pressure respirator" (tight fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

(hhh) "Nonstochastic effect" means a health effect, the severity of which varies with the dose and for which a threshold is believed to exist. Radiation-induced cataract formation is an example of a nonstochastic effect. For purposes of this Chapter, "deterministic effect" is an equivalent term.

(ii) "Positive pressure respirator" means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

(jjj) "Physical description" means the items called for on NRC Form 541 or equivalent form to describe a low-level radioactive waste.

(kkk) "Planned special exposure" means an infrequent exposure to radiation separate from and in addition to the annual occupational dose limits;

(ll) "Powered air-purifying respirator" (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Rule .03(2)(mm)

(mm) "Pressure demand respirator" means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

(nn) "Qualitative fit test" (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

(oo) "Quantitative fit test" (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

(~~t~~pp) "Reference man" means a hypothetical aggregation of human physical and physiological characteristics determined by international consensus. These characteristics may be used by researchers and public health workers to standardize results of experiments and to relate biological insult to a common base.

(qq) "Residual radioactivity" means radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from all licensed and unlicensed sources used by the licensee, but excludes background radiation. It also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of Rule .03 of this Chapter.

(~~u~~rr) "Residual waste" means low-level radioactive waste resulting from processing or decontamination activities that cannot be easily separated into distinct batches attributable to specific waste generators. This waste is attributable to the processor or decontamination facility, as applicable.

(~~v~~ss) "Respiratory protective device" means an apparatus, such as a respirator, used to reduce an individual's intake of airborne radioactive materials.

(tt) "Self-contained breathing apparatus" (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

(~~w~~uu) "Sanitary sewerage" means a system of public sewers for carrying off waste water and refuse, but excluding sewage treatment facilities, septic tanks, and

Rule .03(2)(uu)

leach fields owned or operated by the licensee.

(~~x~~vv) "Shipper" means the licensed entity (i.e., the waste generator, waste collector, or waste processor) who offers low-level radioactive waste for transportation, typically consigning this type of waste to a licensed waste collector, waste processor, or land disposal facility operator.

(~~y~~ww) "Shipping paper" means NRC Form 540 and, if required, NRC Form 540A or equivalent forms which include the information required by DOT in 49 CFR Part 172.

(~~z~~xx) "Source material" has the same meaning as that given in Rule 391-3-17-.01(2)(~~ssss~~uuuu).

(~~aa~~yy) "Stochastic effect" means a health effect that occurs randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects. For purposes of this Chapter, "probabilistic effect" is an equivalent term.

(zz) "Supplied-air respirator" (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

(aaa) "Tight-fitting facepiece" means a respiratory inlet covering that forms a complete seal with the face.

(~~bb~~bbb) "Uniform Low-Level Radioactive Waste Manifest" or "Uniform Manifest" means the combination of NRC Forms 540, 541, and if necessary, 542 ~~or equivalent forms~~, and their respective continuation sheets as needed, or equivalent forms.

(ccc) "User seal check" (fit check) means an action conducted by the respirator user to determine if the respirator is properly seated to the face. Examples include negative pressure check, positive pressure check, irritant smoke check, or isoamyl acetate check.

(~~dd~~ddd) "Very high radiation area" means an area, accessible to individuals, in which radiation levels from radioactive materials external to the body could result in an individual receiving an absorbed dose in excess of Rule .03(2)(ddd)

500 rads (5 Gray) in one hour at one meter from a source of radiation or from any surface that the radiation penetrates.[1]

(~~dd~~eee) "Waste collector" means an entity, operating under a Department, U.S. Nuclear Regulatory Commission, Agreement State, or Licensing State license, whose principal purpose is to collect and consolidate waste generated by others, and to transfer this waste, without processing or repackaging the collected waste, to another licensed waste collector, licensed waste processor, or licensed land disposal facility.

(~~ee~~fff) "Waste description" means the physical, chemical and radiological description of a low-level radioactive waste as called for on NRC Form 541 or equivalent form.

(~~ff~~ggg) "Waste generator" means an entity, operating under a Department, U.S. Nuclear Regulatory Commission, Agreement State, or Licensing State license, who (1) possesses any material or component that contains radioactivity or is radioactively contaminated for which the licensee ~~forsees~~ foresees no further use, and (2) transfers this material or component to a licensed land disposal facility or to a licensed waste collector or processor for handling or treatment prior to disposal. A licensee performing processing or decontamination services may be a "waste generator" if the transfer of low-level radioactive waste from its facility is defined as "residual waste."

(~~gg~~hhh) "Waste processor" means an entity, operating under a Department, U.S. Nuclear Regulatory Commission, Agreement State, or Licensing State license, whose principal purpose is to process, repackage, or otherwise treat low-level radioactive material or waste generated by others prior to eventual transfer of waste to a licensed low-level radioactive waste land disposal facility.

(~~hh~~iii) "Waste type" means a waste within a disposal container having a unique physical description (i.e., a specific waste descriptor code or description; or a waste sorbed on or solidified in a specifically defined media).

(~~ii~~jjj) "Weighting factor" (w_T) for an organ or tissue (T) means the proportion of the

Rule .03(2)(jjj)

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[1] For very high doses received at high dose rates, units of absorbed dose, Gray and rad, are appropriate, rather than units of dose equivalent, Sievert and rem.

risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of w_T are:

ORGAN DOSE WEIGHTING FACTORS

~~Organ or Tissue~~	~~w_T~~
Gonads	0.25
Breast	0.15
Red bone marrow	0.12
Lung	0.12
Thyroid	0.03
Bone surfaces	0.03
Remainder	0.30[a]
Whole Body	1.00[b]

[a] 0.30 results from 0.06 ~~for each of five "remainder" organs, excluding the skin and the~~ lens of the eye, that receive the highest doses.

[b] For the purpose of weighting the external whole body dose, for adding it to the internal dose, a single weighting factor, $w_T = 1.0$, has been specified. The use of other weighting factors for external exposure will be approved on a case-by-case basis until such time as specific guidance is issued.

(3) Implementation

(a) Any existing license condition that is more restrictive than this Rule remains in force until there is an amendment or renewal of the license.

(b) If a license condition exempts a licensee from a provision of Rule 391-3-17-.03 in effect on or before January 1, 1994, it also exempts the licensee from the corresponding provision of this Rule.

(c) If a license condition cites provisions of Rule 391-3-17-.03 in effect prior to January 1, 1994, which do not correspond to any provisions of this Rule, the license condition remains in force until there is an amendment or renewal of the license that modifies or removes this condition.

Rule .03(4)

(4) Radiation Protection Programs

(a) Each licensee shall develop, document, and implement a Radiation Protection Program sufficient to ensure compliance with the provisions of this Rule. See (~~13~~14)(b) of this Rule for record-keeping requirements relating to these Programs.

(b) The licensee shall use, to the extent ~~practicable~~ practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

(c) The licensee shall, at least annually, review the Radiation Protection Program content and implementation.

(d) To implement the ALARA requirements of .03(4)(b), and notwithstanding the requirements in .03(5)(i) of this rule, a constraint on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters, shall be established by licensees such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of ten mrem (0.1 mSv) per year from these emissions. If a licensee subject to this requirement exceeds this dose constraint, the licensee shall report the exceedance as provided in .03(15)(c) and promptly take appropriate corrective action to ensure against recurrence.

(5) Occupational Dose Limits and Dose Limits for Individual Members of the Public

(a) Occupational Dose Limits for Adults.

1. The licensee shall control the occupational dose to individual adults, except for planned special exposures pursuant to (5)(f) of this Rule, in accordance with the following dose limits:

(i) An annual limit, which is the more limiting of:

(I) The total effective dose equivalent being equal to ~~5~~ five rem (0.05 Sv); or.

(II) The sum of the deep dose equivalent and the

Rule .03(5)(a)1.(i)(II)

committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rem (0.50 Sv).

(ii) The annual limits to the lens of the eye, to the skin, and to the extremities which are:

(I) A ~~eye~~ lens dose equivalent of 15 rem (0.15 Sv); and

(II) A shallow dose equivalent of 50 rem (0.50 Sv) to the skin or to any extremity.

2. Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, shall be subtracted from the limits for planned special exposures that the individual may receive during the current year and during the individual's lifetime, listed in (5)(f)5.(i) and (ii) of this Rule.

3. The assigned deep dose equivalent and shallow dose equivalent shall be for the portion of the body receiving the highest exposure.

4. The deep dose equivalent, ~~eye~~ lens dose equivalent, and shallow dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure or the results of individual monitoring are unavailable.

5. Derived air concentration (DAC) and annual limit on intake (ALI) values are specified in Table I of Appendix B to 10 CFR 20.~~1001-20.2401, effective January 1, 1994,~~ and may be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits. See (~~13~~14)(g) of this Rule for maintaining records of these exposures.

6. Notwithstanding the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to ~~10~~ ten milligrams in a week in consideration of chemical toxicity. See footnote 3 of Appendix B 10 CFR 20. ~~1001-20.2401, effective January 1, 1994.~~

Rule .03(5)(a)7.

7. The licensee shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person during the current year. See (5)(e) of this Rule.

(b) Compliance with Requirements for Summation of External and Internal Doses.

1. General Requirements. If the licensee is required to monitor pursuant to both (~~7~~8)(b)1. and 2. of this Rule, the licensee shall demonstrate compliance with the dose limits by summing external and internal doses. If the licensee is required to monitor only pursuant to (~~7~~8)(b)1. of this Rule or only pursuant to (~~7~~8)(b)2. of this Rule, then summation is not required to demonstrate compliance with the dose limits. The licensee must demonstrate compliance with the requirements for summation of external and internal doses pursuant to (5)(b)2., 3., and 4. of this Rule. The dose equivalents for the lens of the eye, the skin, and the extremities are not included in the summation, but are subject to separate limits.

2. Intake by Inhalation. If the only intake of radionuclides is by inhalation, the total effective dose equivalent limit is not exceeded if the sum of the deep dose equivalent divided by the total effective dose equivalent limit and one of the following does not exceed unity:

(i) The sum of the fractions of the inhalation ALI for each radionuclide;

(ii) The total number of derived air concentration-hours (DAC-hours) for all radionuclides divided by 2,000; or

(iii) The sum of the calculated committed effective dose equivalents to all significantly irradiated organs or tissues (T) calculated from bioassay data using appropriate biological models and expressed as a fraction of the annual limit. For purposes of this requirement, an organ or tissue is deemed to
be significantly irradiated if, for that organ or tissue, the product of the weighting factors, w_T, and the committed dose equivalent, $H_{T,50}$, per unit intake is greater than ~~1~~0 ten percent of the maximum weighted value of H_{50} (i.e., $w_T H_{T,50}$), per unit

Rule .03(5)(b)2.(iii)

intake for any organ or tissue.

3. Intake by Oral Ingestion. If the occupationally-exposed individual receives an intake of radionuclides by oral ingestion greater than ~~10~~ ten percent of the applicable oral ALI, the licensee shall account for this intake and include it in demonstrating compliance with the limits.

4. Intake through Wounds or Absorption through Skin. The licensee shall evaluate and, to the extent practical, account for intakes through wounds or skin absorption. The intake through intact skin has been included in the calculation of DAC for hydrogen-3 and does not need to be evaluated or accounted for pursuant to (5)(b)4. of this Rule.

(c) Determination of External Dose from Airborne Radioactive Material.

1. Licensees shall, when determining the dose from airborne radioactive material, include the contribution to the deep dose equivalent, ~~eye~~ lens dose equivalent, and shallow dose equivalent from external exposure to the radioactive cloud. See Appendix B, footnotes 1 and 2, of 10 CFR 20.~~1001-20.2401, effective January 1, 1994.~~

2. Airborne radioactivity measurements and DAC values shall not be used as the primary means to assess the deep dose equivalent when the airborne radioactive material includes radionuclides other than noble gases or if the cloud of airborne radioactive material is not relatively uniform. The determination of the deep dose equivalent to an individual shall be based upon measurements using instruments or individual monitoring devices.

(d) Determination of Internal Exposure.

1. For purposes of assessing the dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required under (~~7~~8)(b) of this Rule, take suitable and timely measurements of:

(i) Concentrations of radioactive materials in air in work areas during operations;

Rule .03(5)(d)1.(ii)

(ii) Quantities of radionuclides in the body;

(iii) Quantities of radionuclides excreted from the body; or

(iv) Combinations of these measurements.

2. Unless respiratory protective equipment is used, as provided in ~~(9)(c)~~ (10)(d) of this Rule, or the assessment of intake is based on bioassays, the licensee shall assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.

3. When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior of the material in an individual is known, the licensee may:

(i) Use that information to calculate the committed effective dose equivalent, and, if used, the licensee shall document that information in the individual's record;

(ii) Upon prior approval of the Department, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material, for example, aerosol size distribution or density; and

(iii) Separately assess the contribution of fractional intakes of Class D, W, or Y compounds of a given radionuclide to the committed effective dose equivalent. See Appendix B of 10 CFR 20. ~~1001-20.2401, effective January 1, 1994.~~

4. If the licensee chooses to assess intakes of Class Y material using the measurements given in (5)(d)1.(ii) or (iii) of this Rule, the licensee may delay the recording and reporting of the assessments for periods up to ~~7~~ seven months, unless otherwise required by (~~1~~415)(b) or (~~1~~415)(c) of this Rule. This delay permits the licensee to make additional measurements basic to the assessments.

5. If the identity and concentration of each radionuclide in a mixture are known, the fraction of the DAC applicable to the mixture for use in calculating DAC-hours shall be either:

Rule .03(5)(d)5.(i)

(i) The sum of the ratios of the concentration to the appropriate DAC value (i.e. D, W, or Y) from Appendix B of 10 CFR 20 ~~1001-20.2401, effective January 1, 1994~~, for each radionuclide in the mixture; or

(ii) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture.

6. If the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.

7. When a mixture of radionuclides in the air exists, a licensee may disregard certain radionuclides in the mixture if:
   (i) The licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in (5)(a) of this Rule and in complying with the monitoring requirements in (~~7~~8)(b)2. of this Rule;

   (ii) The concentration of any radionuclide disregarded is less than ~~10~~ ten percent of its DAC; and

   (iii) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30 percent.

8. When determining the committed effective dose equivalent, the following information may be considered:

   (i) In order to calculate the committed effective dose equivalent, the licensee may assume that the inhalation of one ALI, or an exposure of 2,000 DAC-hours, results in a committed effective dose equivalent of ~~5~~ five rem (0.05Sv) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent;

   (ii) When the ALI (and the associated DAC) is determined by the nonstochastic organ dose limit of 50 rem (0.50 Sv), the intake of radionuclides that would result in a committed effective

Rule .03(5)(d)8.(ii)

dose equivalent of ~~5~~ five rem (0.05 sv), (i.e., the stochastic ALI) is listed in parentheses in Table I of Appendix B of 10 CFR 20. ~~1001-20.2401, effective January 1, 1994.~~ In this case, the licensee may, as a simplifying assumption, use the stochastic ALIs to determine the committed effective dose equivalent. However, if the licensee uses the stochastic

ALIs, the licensee shall also demonstrate that the limit in (5)(a)1.(i)(II) of this Rule is not exceeded.

(e) Determination of Prior Occupational Dose.

1. For each individual who is likely to receive, in a year, an occupational dose requiring monitoring pursuant to (~~7~~8)(b) of this Rule, the licensee shall:

(i) Determine the occupational radiation dose received during the current year; and

(ii) Attempt to obtain the records of lifetime cumulative occupational radiation dose.

2. Prior to permitting an individual to participate in a planned special exposure, the licensee shall determine:

(i) The internal and external doses from all previous planned special exposures; and

(ii) All doses in excess of the limits, including doses received during accidents and emergencies, received during the lifetime of the individual.

3. In complying with the requirements of (5)(e)1. of this Rule, a licensee may:

(i) 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 individual's 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;

Rule .03(5)(e)3.(ii)

(ii) Accept, as the record of lifetime cumulative radiation dose, an up-to-date Department Form "Occupational Radiation Exposure History" 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

(iii) Obtain of the individual's dose equivalent from the 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, telegram, electronic media, facsimile, or letter. The licensee shall request a written verification of the dose data if the authenticity of the transmitted report cannot be established.

4. The licensee shall record the exposure history, as required by (5)(e)1. of this Rule, on Department Form "Occupational Radiation Exposure History" or other clear and legible record, and all of the information required on that form. The form or record shall show each period in which the individual received occupational exposure to radiation or radioactive material and shall be signed by the individual who received the exposure. For each period for which the licensee obtains , the licensee shall use the dose shown in the report in preparing the Department Form "Occupational Radiation Exposure History" or equivalent form. For any period in which the licensee does not obtain a report, the licensee shall place a notation on the "Occupational Radiation Exposure History" or equivalent form indicating the periods of time for which data are not available.

5. Licensees are not required to partition historical dose between external dose equivalents and internal committed dose equivalents of radionuclides assessed under the Regulations in effect before January 1, 1994. Further, occupational exposure histories obtained and recorded on Department Form "Occupational Radiation Exposure History" or equivalent before January 1, 1994, might not
have included effective dose equivalent but may be used in the absence of specific information on the intake of radionuclides by the individual.

Rule .03(5)(e)6.

6. If the licensee is unable to obtain a complete record of an individual's current and previously accumulated occupational dose, the licensee shall assume:

(i) In establishing administrative controls under (5)(a)7. of this Rule, for the current year, that the allowable dose limit for

the individual is reduced by 1.25 rem (12.5 mSv) for each quarter for which records were unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure; and

(ii) That the individual is not available for planned special exposures.

7. The licensee shall retain the records on Department Form "Occupational Radiation Exposure History" or equivalent until the Department terminates each pertinent license requiring this record. The licensee shall retain records used in preparing Department Form "Occupational Radiation Exposure History" or equivalent for ~~3~~ three years after the record is made.

(f) Planned Special Exposures. A licensee may authorize an adult worker to receive doses in addition to and accounted for separately from the doses received under the limits specified in (5)(a) of this Rule provided that each of the following conditions is satisfied:

1. The licensee authorizes a planned special exposure only in an exceptional situation when alternatives that might avoid the higher exposure estimated to result from the planned special exposure are unavailable or impractical (i.e., industrial radiography source retrieval for an area that cannot be evacuated).

2. The management official of the licensee (and employer if the employer is not the licensee) specifically authorizes the planned special exposure, in writing, before the exposure occurs.

3. Before a planned special exposure, the licensee ensures that each individual involved is:

(i) Informed of the purpose of the planned operation;

Rule .03(5)(f)3.(ii)

(ii) Informed of the estimated doses and associated potential risks and specific radiation levels or other conditions that might be involved in performing the task; and

(iii) Instructed in the measures to be taken to keep the dose ALARA considering other risks that may be present.

4. Prior to permitting an individual to participate in a planned special

exposure, the licensee ascertains prior doses as required by (5)(e)2. of this Rule during the lifetime for each individual involved.

5. Subject to (5)(a)2. of this Rule, the licensee shall not authorize a planned special exposure that would cause an individual to receive a dose from all planned special exposures and all doses in excess of the limits to exceed:

   (i) The numerical values of any of the dose limits in (5)(a)1. of this Rule in any year; and

   (ii) Five times the annual dose limits in (5)(a)1. of this Rule during the individual's lifetime.

6. The licensee maintains records of the conduct of a planned special exposure in accordance with (~~13~~14)(f) of this Rule and submits a written report in accordance with (~~14~~15)(d) of this Rule.

7. The licensee records the best estimate of the dose resulting from the planned special exposure in the individual's record and informs the individual, in writing, of the dose within 30 days after the date of the planned special exposure. The dose from planned special exposures shall not be considered in controlling the future occupational dose of the individual pursuant to (5)(a)1. of this Rule but shall be included in evaluations required by (5)(f)1. and (5)(f)5. of this Rule.

(g) Occupational Dose Limits for Minors. The annual occupational dose limits for minors are ~~10~~ ten percent of the annual occupational dose limits specified for adult workers in (5)(a) of this Rule.

(h) Dose to an Embryo/Fetus.

Rule.03(5)(h)1.

1. The licensee shall ensure that the dose equivalent to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv). For record-keeping requirements, see (~~13~~14)(g) of this Rule.

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[2] The National Council on Radiation Protection and Measurements recommended in NCRP Report No. 91

2. The licensee shall make efforts to avoid substantial variation[2] above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in (5)(h)1. of this Rule.

3. The dose equivalent to an embryo/fetus shall be taken as the sum of:

   (i) The deep-dose equivalent to the declared pregnant woman;

   (ii) The dose equivalent to the embryo/fetus from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman; and

   (iii) The dose that is most representative of the dose to the embryo/fetus from external radiation, in the mother's lower torso region.

      (I) If multiple measurements have not been made, assignment of the highest deep dose equivalent for the declared pregnant woman shall be the dose equivalent to the embryo/fetus, in accordance with (5)(e)3.; or

      (II) If multiple measurements have been made, assignment of the dose equivalent for the declared pregnant woman from the individual monitoring device which is most representative of the dose equivalent to the embryo/fetus shall be the dose equivalent to the embyro/fetus. Assignment of the highest deep dose equivalent for the declared pregnant woman to the embyro/fetus is not required unless that dose equivalent is also the most representative deep dose equivalent for the the lower torso region.

4. If by the time the woman declares pregnancy to the licensee the dose

Rule.03(5)(h)4.

equivalent to the embryo/fetus is found to have exceeded

(June 1, 1987) that no more than 0.05 rem (0.5 mSv) to the embryo/fetus be received in any one month.

0.45 rem (4.5 mSv), or is within 0.05 rem (0.5 mSv) of this dose equivalent, the licensee shall be deemed to be in compliance with (5)(h)1. of this Rule if the additional dose equivalent to the embryo/fetus does not exceed 0.05 rem (0.5 mSv) during the remainder of the pregnancy.

5. If the declared pregnant woman has not notified the licensee of the estimated date of conception, the licensee shall ensure that the dose equivalent to the embryo/fetus as specified in (5)(h)3. of this Rule due to occupational exposure of the declared pregnant woman does not exceed 0.05 rem (0.5 mSv) per month during the remainder of the pregnancy. If, after initially declaring her pregnancy, a declared pregnant woman advises the licensee of the estimated date of conception, 10% of the dose limits specified in (5)(a) and (d) of this Rule shall apply.

(i) Radiation Dose Limits for Individual Members of the Public.

1. Each licensee shall conduct operations so that:

(i) Except as provided in (5)(i)1.(iii)the total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contributions from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with Rule .05(7)(k), from voluntary participation in medical research programs, and ~~the dose contribution~~ from the licensee's disposal of radioactive material into sanitary sewerage in accordance with (13)(c) of this Rule; and

(ii) The dose in any unrestricted area from external sources, exclusive of the dose contributions from individuals administered radioactive material and released in accordance with Rule .05(7)(k), does not exceed 0.002 rem (0.02 mSv) in any one hour.

(iii) The total effective dose equivalent to individual members of the public from infrequent exposure to radiation from radiation machines does not exceed .5 rem (5 mSv).

2. A licensee or license applicant may apply for prior Department Rule .03(5)(i)2.

authorization to operate up to an annual dose limit for an individualmember of the public of 0.5 rem (5 mSv). The licensee or license applicant shall include the following information in this

application:

(i) Demonstration of the need for and the expected duration of operations in excess of the limit in (5)(i)1. of this Rule;

(ii) The licensee's program to assess and control dose within the 0.5 rem (5 mSv) annual limit; and

(iii) The procedure to be followed to maintain the dose as low as is reasonably achievable.

3. In addition to the requirements of this Rule, a licensee subject to the provisions of the U.S. Environmental Protection Agency's (EPA) generally applicable environmental radiation standards in 40 CFR Part 190 shall comply with those standards.

4. The Department may impose additional restrictions on radiation levels in unrestricted areas and on the total quantity of radionuclides that a licensee may release in effluents in order to restrict the collective dose.

(j) Compliance with Dose Limits for Individual Members of the Public.

1. The licensee shall make or cause to be made, as appropriate, surveys of radiation levels in unrestricted areas and radioactive materials in effluents released to unrestricted areas to demonstrate compliance with the dose limits for individual members of the public in (5)(i) of this Rule.

2. A licensee shall show compliance with the annual dose limit in (5)(i) of this Rule by:

(i) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit; or

(ii) Demonstrating that:

Rule.03(5)(j)2.(ii)(I)

(I) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed

the values specified in Table II of Appendix B of 10 CFR 20. ~~1001-20.2401, effective January 1, 1994.~~

(II) If an individual were continually present in an unrestricted area, the dose from external sources would not exceed 0.002 rem (0.02 mSv) in one hour and 0.05 rem (0.50 mSv) in one year.

3. Upon approval from the Department, the licensee may adjust the effluent concentration values in Appendix B, Table II of 10 CFR 20 ~~1001-20.2401, effective January 1, 1994~~, for members of the public, to take into account the actual physical and chemical characteristics of the effluents (e.g., aerosol size distribution, solubility, density, radioactive decay equilibrium, and chemical form).

(6) Testing for Leakage or Contamination of Sealed Sources

(a) The licensee in possession of any sealed source shall assure that:

1. Each sealed source, other than hydrogen-3, with a half-life greater than 30 days and in any form other than gas, shall be tested for leakage or contamination as follows:

(i) Prior to initial use;

(ii) Unless otherwise authorized by the Department, at intervals not to exceed ~~6~~ six months, except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed ~~3~~ three months;

(iii) At any other time there is reason to suspect that a sealed Rule .03(6)(a)1.(iv) source might have been damaged or might be leaking, it shall be tested for leakage before further use; and

(iv) In the absence of a certificate from a transferor indicating that a test for leakage has been made within ~~6~~ six months prior to the transfer, the sealed source shall not be put into use until tested and the results received.

2. Tests for leakage for all sealed sources, except those manufactured to contain radium, shall be capable of detecting the presence of

Rule .03(6)(a)2.

0.005 μCi (185 Bq) of radioactive material on a test sample. Test

samples shall be taken from the sealed source or from the surfaces of the container in which the sealed source is stored or mounted on which one might expect contamination to accumulate. For sealed sources contained in a device, test samples are obtained when the source is in the "off" position.

3. Tests for leakage for sources manufactured to contain radium shall be capable of detecting an absolute leakage rate of 0.001 µCi (37 Bq) of radon-222 in a 24-hour period when the collection efficiency for radon-222 and its daughters has been determined with respect to collection method, volume, and time.

4. Test samples shall also be taken from the interior surfaces of the container in which sealed sources of radium are stored. This test shall be capable of detecting the presence of 0.005 µCi (185 Bq) of a radium daughter which has a half-life greater than 4 four days.

5. Notwithstanding the periodic test for leakage required, any sealed source is exempt from such tests for leakage when the sealed source contains 100 µCi (3.7 MBq) or less of beta- or gamma-emitting material or ~~10~~ ten µCi (370 kBq) or less of alpha-emitting material.

(b) Tests for leakage or contamination shall be performed by persons specifically authorized by the Department, an Agreement State, a Licensing State, or the U.S. Nuclear Regulatory Commission to perform such services.

(c) The following shall be considered evidence that the sealed source is leaking:

1. The presence of 0.005 µCi (185 Bq) or more of removable contamination on any test sample. If the test of a sealed source,other than radium, reveals the presence of 0.005 µCi (185 Bq) or more of removable contamination, the licensee shall immediately withdraw the sealed source from use, take action to prevent the spread of contamination, and cause the sealed source to be decontaminated and repaired or to be disposed of in accordance with this Rule.

2. Leakage of 0.001 µCi (37 Bq) of radon-222 per 24 hours for sealed sources manufactured to contain radium. If the test of a sealed source manufactured to contain radium reveals the presence of

Rule .03(6)(c)2.

removable contamination resulting from the decay of 0.005 μCi (185 Bq) or more of radium-226, the licensee shall immediately withdraw the sealed source from use, take action to prevent the spread of contamination, and cause the sealed Rule source to be decontaminated and repaired or to be disposed of in accordance with this Rule.

(d) Records of test results for sealed sources shall be made pursant to (~~13~~)(14)(d).

(e) Reports of test results for leaking or contaminated sealed sources shall be made pursuant to (~~14~~15)(~~hg~~) of this Rule.

(7) Radiological Requirements for License Termination

(a) General provisions and scope.

1. The requirements in this section apply to the decommissioning of facilities licensed under Rule .02(8)(g), (Licensing of Radioactive Materials. Amended);

2. The requirements in this section do not apply to sites which:

(i) Have been decommissioned prior to **(insert the effective date of the rule)** in accordance with requirements identified in .03(7) and Rule .02 of this Chapter; or

(ii) Have previously submitted and received Department approval on a decommissioning plan by **(insert the effective date of this rule)**; or

3. After a site has been decommissioned and the license terminated in accordance with the requirements in this section, the Department will require additional cleanup only if, based on new information, it determines that the requirements of this section were not met and residual radioactivity remaining at the site could result in significant threat to public health and safety.

4. When calculating TEDE to the average member of the critical group the licensee shall determine the peak annual TEDE dose expected within the first 1000 years after decommissioning.

Rule .03(7)(b)

(b) Radiological requirements for unrestricted use. A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Determination of the levels which are ALARA must take into account consideration of any detriments, such as deaths from transportation accidents, expected to potentially result from decontamination and waste disposal.

(c) Alternate requirements for license termination.

1. The Department may terminate a license using alternate requirements greater than the dose requirements of .03(7)(b) if the licensee:

(i) Provides assurance that public health and safety would continue to be protected, and that it is unlikely that the dose from all man-made sources combined, other than medical, would be more than the 100 mrem/y (1 mSv/y) limit of .03(5)(i),
by submitting an analysis of possible sources of exposure;

(ii) Reduces doses to ALARA levels, taking into consideration any detriments such as traffic accidents expected to potentially result from decontamination and waste disposal; and

(iii) Has submitted a decommissioning plan to the Department indicating the licensee's intent to decommission in accordance with requirements of Rule .02(18)(d), and specifying that the licensee proposes to decommission by use of alternate requirements. The licensee shall document in the decommissioning plan how the advice of individuals and institutions in the community who may be affected by the decommissioning has been sought and addressed, as appropriate, following analysis of that advice. In seeking such advice, the licensee shall provide for:

(I) Participation by representatives of a broad cross section of community interests who may be affected by

Rule .03(7)(c)1.(iii)(I)

the decommissioning;

(II) An opportunity for a comprehensive, collective discussion on the issues by the participants represented; and

(III) A publicly available summary of the results of all such discussions, including a description of the individual viewpoints of the participants on the issues and the extent of agreement and disagreement among the participants on the issues.

2. The use of alternate requirements to terminate a license requires the approval of the Department after consideration of the Department's recommendations that will address any comments provided by the U.S. Environmental Protection Agency (EPA) and any public comments submitted in accordance with (7)(d) of this rule.

(d) Public notification and public participation. Upon the receipt of a decommissioning plan from the licensee, or a proposal by the licensee for release of a site in accordance with (7)(c) of this Rule, or whenever the Department deems such notice to be in the public interest, the Department will:

1. Notify and solicit comments from:

(i) local and State governments in the vicinity of the site and any Indian Nation or other indigenous people that have treaty or statutory rights that could be affected by the decommissioning; and

(ii) the EPA for cases where the licensee proposes to release a site in accordance with (7)(c); and

2. Publish a notice in the local newspaper(s), letters to State or local organizations, or other appropriate forum, that is readily accessible to individuals in the vicinity of the site, and solicit comments from affected parties.

(e) Minimization of contamination. Applicants for licenses, other than renewals,

after **(insert effective date of this rule)**, shall describe in the application how facility design and procedures for operation will minimize, to the extent practical, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practical, the generation of radioactive waste.

(~~7~~8) Surveys and Monitoring

(a) General.

1. Each licensee shall make, or cause to be made, surveys that:

(i) ~~Are~~ May be necessary for the licensee to demonstrate compliance with this Rule; and

(ii) Are ~~necessary~~ reasonable under the circumstances to evaluate:

(I) The magnitude and extent of radiation levels;

(II) Concentrations or quantities of radioactive material; and

(III) The potential radiological hazards ~~that could be present~~.

2. The licensee shall ensure that instruments and equipment used for quantitative radiation measurements (e.g., dose rate and effluent monitoring) are calibrated periodically, at least annually, for the radiation measured except when a more frequent interval is specified in other applicable parts of these Rules or a license condition.

3. All personnel dosimeters, except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to any extremity, that require processing to determine the radiation dose and that are used by licensees to comply with (5)(a) of this Rule, with other applicable provisions of this Chapter, or with conditions specified in a license shall be processed and evaluated by a qualified dosimetry processor. A dosimetry processor is qualified if it:

Rule .03(8)(a)3.(i)

(i) Holds current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology; and

(ii) Is approved in this accreditation process for the type of radiation or radiations included in the NVLAP program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored.

4. The licensee shall ensure that adequate precautions are taken to prevent a deceptive exposure of an individual monitoring device.

(b) Conditions Requiring Individual Monitoring of External and Internal Occupational Dose. Each licensee shall monitor exposures to sources of radiation and radioactive material at levels sufficient to demonstrate compliance with the occupational dose limits of this Rule. As a minimum:

1. Each licensee shall monitor occupational exposure to radiation and shall supply and require the use of individual monitoring devices by:

(i) Adults likely to receive, in ~~1~~ one year from sources external to the body, a dose in excess of ~~10~~ ten percent of the limits in (5)(a)1. of this Rule;

(ii) Minors ~~and declared pregnant women~~ likely to receive, in ~~1~~ one year from sources external to the body, a dose in excess of ~~10~~ ten percent of any of the applicable limits in (5)(g) or (5)(h) of this Rule; ~~and~~

(iii) 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);[3] and

(~~iii~~iv) Individuals entering a high or very high radiation area.

2. Each licensee shall monitor, to determine compliance with (5)(d) of Rule .03(8)(b)2.

[3]All of the occupational doses in .03(5)(a) continue to be applicable to the declared pregnant worker as long as the embryo/fetus dose limit is not exceeded.

this Rule, the occupational intake of radioactive material by, and assess the committed effective dose equivalent to:

(i) Adults likely to receive, in ~~1~~ one year, an intake in excess of ~~10~~ ten percent of the applicable ALI in Table I, Columns 1 and 2, of Appendix B of 10 CFR 20; and

(ii) Minors ~~and declared pregnant women~~ likely to receive, in ~~1~~ one year, a committed effective dose equivalent in excess of 0.05 rem (0.50 mSv).

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

(89) Control Of Exposure From External Sources In Restricted Areas

(a) Control of Access to High Radiation Areas.

1. The licensee shall ensure that each entrance or access point to a high radiation area has one or more of the following features:

(i) A control device that, upon entry into the area, causes the level of radiation to be reduced below that level at which an individual might receive a deep dose equivalent of 0.1 rem (1 mSv) in ~~1~~ one hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates;

(ii) A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry; or

(iii) Entryways that are locked, except during periods when access to the areas is required, with positive control over each individual entry.

2. In place of the controls required by ~~89~~(89)(a)1. of this Rule, the licensee may substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry.

Rule.03(9)(a)3.

3. The licensee may apply to the Department for approval of alternative methods for controlling access to high radiation areas.

4. The licensee shall establish the controls required by (~~8~~9)(a)1. and (~~8~~9)(a)3. of this Rule in a way that does not prevent individuals from leaving a high radiation area.

5. The licensee is not required to control each entrance or access point to a room or other area that is a high radiation area solely because of the presence of radioactive materials prepared for transport and packaged and labeled in accordance with the regulations of the U.S. Department of Transportation provided that:

   (i) The packages do not remain in the area longer than ~~3~~ three days; and

   (ii) The dose rate at ~~1~~ one meter from the external surface of any package does not exceed 0.01 rem (0.1 mSv) per hour.

6. The licensee is not required to control entrance or access to rooms or other areas in hospitals solely because of the presence of patients containing radioactive material, provided that there are personnel in attendance who will take the necessary precautions to prevent the exposure of individuals to radiation or radioactive material in excess of the established limits in this Rule and to ensure operation within the ALARA provisions of the licensee's Radiation Protection Program.

7. The licensee is not required to control entrance or access to rooms or other areas containing sources of radiation capable of producing a high radiation area as described in Rule 391-3-17-.01(2)(~~s~~sqq) if the licensee has met all the specific requirements for access and control specified in other applicable Rules, such as 391-3-17-.04 for industrial radiography.

(b) Control of Access to Very High Radiation Areas.

1. In addition to the requirements in (~~8~~9)(a) of this Rule, the licensee shall institute additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 Gy) or more in ~~1~~

Rule .03(9)(b)1.

one hour at ~~1~~ one meter from a source of radiation or any surface through which the radiation penetrates. This requirement does not

apply to rooms or areas in which diagnostic x-ray systems are the only source of radiation, or to non-self-shielded irradiators.

2. The licensee is not required to control entrance or access to rooms or other areas containing sources of radiation capable of producing a very high radiation area as defined in this Rule if the licensee has met all the specific requirements for access and control specified in other applicable Rules, such as 391-3-17-.04 for industrial radiography.

(~~9~~10) Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas

(a) Use of Process or Other Engineering Controls. The licensee shall use, to the extent practicable, process or other engineering controls (e.g., containment, decontamination, or ventilation) to control the concentrations of radioactive material in air.

(b) Use of Other Controls. When it is not ~~practicable~~ practical to apply process or other engineering controls to control the concentrations of radioactive material in air to values below those that define an airborne radioactivity area, the licensee shall, consistent with maintaining the total effective dose equivalent ALARA, increase monitoring and limit intakes by one or more of the following means:

1. Control of access;

2. Limitation of exposure times;

3. Use of respiratory protection equipment; or

4. Other controls.

(c) If the licensee performs an ALARA analysis to determine whether or not respirators should be used, the licensee may consider safety factors other than radiological factors. The licensee should also consider the impact of respirator use on workers' industrial health and safety.

(~~c~~d) Use of Individual Respiratory Protection Equipment.
Rule .03(10)(d)1.

1. If the licensee uses respiratory protection equipment to limit intakes pursuant to (~~9~~10)(b) of this Rule:

(i) Except as provided in (~~9~~10)(~~e~~d)1.(ii) of this Rule, the licensee shall use only respiratory protection equipment that is tested and certified by or had certification extended by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH/MSHA).

(ii) The licensee may use equipment that has not been tested or certified by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration or had certification extended by NIOSH/MSHA or for which there is no schedule for testing or certification, provided the licensee has submitted to the Department and the Department has approved an application for authorized use of that equipment, including a demonstration by testing, or a demonstration on the basis of reliable test information, that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under anticipated conditions of use.

(iii) The licensee shall implement and maintain a respiratory protection program that includes:

(I) Air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate exposures;

(II) Surveys and bioassays, as appropriate, to evaluate actual intakes;

(III) Testing of respirators for operability (user seal check for face sealing devices and functional check for others) immediately prior to each use;

(IV) Written procedures regarding: respirator selection; ~~fitting~~ fit testing; breathing air quality; inventory control; storage, issuance, maintenance, repair, and ~~testing of respirators~~ quality assurance of respiratory protection

Rule .03(10)(d)1.(iii)(IV)

equipment, including testing for operability immediately prior to each use; supervision and training of personnel; monitoring, including air

sampling and bioassays; and record-keeping; and

(V) Determination by a physician prior to initial fitting of face sealing respirators; before the first use of non-face sealing respirators; and either every 12 months thereafter or periodically at a frequency determined by a physician, that the individual user is medically fit to use the respiratory protection equipment.

(VI) Fit testing, with fit factor " ten times the APF for negative pressure devices", and a fit factor " 500 for any positive pressure, continuous flow, and pressure-demand devices", before the first field use of tight fitting, face-sealing respirators and periodically thereafter at a frequency not to exceed one year. Fit testing must be performed with the facepiece operating in the negative pressure mode.

~~(iv) The licensee shall issue a written policy statement on respirator usage covering:~~

~~(I) The use of process or other engineering controls instead of respirators;~~

~~(II) The routine, nonroutine, and emergency use of respirators; and~~

~~(III) The length of periods of respirator use and relief from respirator use.~~

(iv) The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other conditions that might require such relief.

Rule .03(10)(d)1.(v)

(vi) The licensee shall also consider limitations appropriate to the type and mode of use. ~~use equipment within the equipment manufacturer's expressed limitations for type and mode of use and shall provide proper visual,~~

~~communication, and other special capabilities, such as adequate skin protection when needed~~. When selecting respiratory devices the licensee shall provide for vision correction, adequate communication, low temperature work environments, and the concurrent use of other safety or radiological protection equipment. The licensee shall use equipment in such a way as not to interfere with the proper operation of the respirator.

(vi) Standby rescue persons are required whenever one-piece atmosphere-supplying suits, or any combination of supplied air respiratory protection device and personnel protective equipment are used from which an unaided individual would have difficulty extricating himself. The standby persons must be equipped with respiratory protection devices or other apparatus appropriate for the potential hazards. The standby rescue persons shall observe or otherwise maintain continuous communication with the workers (visual, voice, signal line, telephone, radio, or other suitable means), and be immediately available to assist them in case of a failure of the air supply or for any other reason that requires relief from distress. A sufficient number of standby rescue persons must be immediately available to assist all users of this type of equipment and to provide effective emergency rescue if needed.

(vii) Atmosphere-supplying respirators must be supplied with respirable air of grade D quality or better as defined by the Compressed Gas Association in publication G-7.1, "Commodity Specification for Air," 1997 and included in the regulations of the Occupational Safety and Health Administration (29 CFR 1910.134(i)(1)(ii)(A) through (E). Grade D quality air criteria include:

(I) Oxygen content (v/v) of 19.5-23.5%;

(II) Hydrocarbon (condensed) content of five milligrams per

Rule .03(10)(d)1.(vii)(II)

cubic meter of air or less;

(III) Carbon monoxide (CO) content of ten ppm or less;

(IV) Carbon dioxide content of 1,000 ppm or less; and

(V) Lack of noticable odor.

(viii) The licensee shall ensure that no objects, materials or substances, such as facial hair, or any conditions that interfere with the face to facepiece seal or valve function, and that are under the control of the respirator wearer, are present between the skin of the wearer's face and the sealing surface of a tight-fitting respirator facepiece.

(ix) In estimating the dose to individuals from intake of airborne radioactive materials, the concentration of radioactive material in the air that is inhaled when respirators are worn is initially assumed to be the ambient concentration in air without respiratory protection, divided by the assigned protection factor. If the dose is later found to be greater than the estimated dose, the corrected value must be used. If the dose is later found to be less than the estimated dose, the corrected value may be used.

~~2. When estimating exposure of individuals to airborne radioactive materials, the licensee may make allowance for respiratory protection equipment used to limit intakes pursuant to (9)(b) of this Rule provided that the following conditions, in addition to those in (9)(c)1. of this Rule, are satisfied:~~

~~(i) The licensee selects respiratory protection equipment that provides a protection factor (specified in Appendix A of 10 CFR 20.1001-20.2401, effective January 1, 1994) greater than the multiple by which peak concentrations of airborne radioactive materials in the working area are expected to exceed the values specified in Appendix B, Table I, Column 3 of 10 CFR 20.1001-20.2401, effective January 1, 1994. However, if the selection of respiratory protection equipment with a protection factor greater than the peak concentration is~~

Rule .03(10)(e)

~~inconsistent with the goal specified in (9)(b) of this Rule of keeping the total effective dose equivalent ALARA, the licensee may select respiratory protection equipment with a lower protection factor, but only if such a selection would result in keeping the total effective dose equivalent ALARA. The concentration of radioactive material in the air that is~~

~~inhaled when respirators are worn may be initially estimated by dividing the average concentration in air, during each period of uninterrupted use, by the protection factor. If the exposure is later found to be greater than initially estimated, the corrected value must be used; if the exposure is later found to be less than initially estimated, the corrected value may be used.~~

~~(ii) The licensee shall obtain authorization from the Department before assigning respiratory protection factors in excess of those specified in Appendix A of 10 CFR 20.1001-20.2401, effective January 1, 1994. The Department may authorize a licensee to use higher protection factors on receipt of an application that:~~

~~(I) Describes the situation for which a need exists for higher protection factors;~~

~~(II) Demonstrates that the respiratory protection equipment provides these higher protection factors under the proposed conditions of use.~~

~~3. The licensee shall use as emergency equipment only respiratory protection equipment that has been specifically certified by or had certification extended for emergency use by NIOSH/MSHA.~~

~~4. The licensee shall notify the Department in writing at least 30 days before the date that respiratory protection equipment is first used under the provisions of either (9)(c)1. or (9)(c)2. of this Rule.~~

(~~d~~e) Further Restrictions on the Use of Respiratory Protection Equipment. The Department may impose restrictions in addition to those in (~~9~~10)(b) and (~~9~~10)(c) of this Rule and Appendix A to 10 CFR 20~~.1001-20.2401, effective January 1, 1994~~, in order to:

1. Ensure that the respiratory protection program of the licensee is adequate to limit ~~exposures~~ doses ~~of~~ to individuals from intakes of ~~to~~ airborne radioactive materials consistent with maintaining total effective dose equivalent ALARA; and Rule .03(10)(e)1.

2. Limit the extent to which a licensee may use respiratory protection

equipment instead of process or other engineering controls.

(f) Application for use of higher assigned protection factors. The licensee shall obtain authorization from the Department before using assigned protection factors in excess of those specified in Appendix A to 10 CFR Part 20. The Department may authorize a licensee to use higher assigned protection factors on receipt of an application that:

1. Describes the situation for which a need exists for higher protection factors; and

2. Demonstrates that the respiratory protection equipment provides these higher protection factors under the proposed conditions of use.

(~~10~~11) Storage and Control of Licensed Material

(a) Security and Control of Licensed Radioactive Material. The licensee shall secure licensed materials from unauthorized removal or access.

(b) Control of material sources of radiation not in storage. The licensee shall maintain constant surveillance and use devices or administrative procedures to prevent unauthorized use of licensed radioactive material that is in an unrestricted area and that is not in storage or in a patient.

(~~11~~12) Precautionary Procedures

(a) Caution Signs.

1. Standard Radiation Symbol. Unless otherwise authorized by the Department, the symbol prescribed by (~~11~~12)(a) of this Rule uses the colors magenta (or purple or black) on yellow background. The symbol prescribed is the three-bladed design as follows:

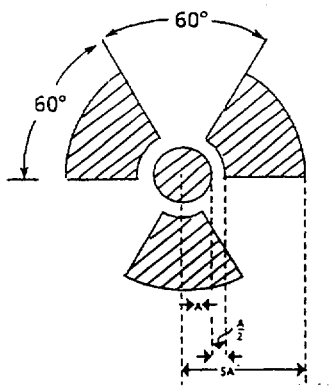
(i) Cross-hatched area is to be magenta, purple, or black; and

Rule .03(12)(a)1.(ii)

(ii) The background is to be yellow.

2. Exception to Color Requirements for Standard Radiation Symbol. Notwithstanding the requirements of (~~11~~12)(a)1. of this Rule, licensees are authorized to label sources, source holders, or device components containing sources of radiation that are subjected to

high temperatures with conspicuously etched or stamped radiation caution symbols without a color requirement.



RADIATION SYMBOL

3. In addition to the contents of signs and labels prescribed in this Rule, the licensee shall provide, on or near the required signs and labels, additional information, as appropriate, to make individuals aware of potential radiation exposures and to minimize the exposures.

(b) Posting Requirements.

1. Posting of Radiation Areas. The licensee shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA."

2. Posting of High Radiation Areas. The licensee shall post each high

radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA." The licensee may satisfy this

Rule .03(12)(b)2.

requirement by posting the sign at the boundary of the high radiation area.

3. Posting of Very High Radiation Areas. The licensee shall post each very high radiation area with a conspicuous sign or signs bearing the radiation symbol and words "GRAVE DANGER, VERY HIGH RADIATION AREA."

4. Posting of Airborne Radioactivity Areas. The licensee shall post each airborne radioactivity area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, AIRBORNE RADIOACTIVITY AREA" or "DANGER, AIRBORNE RADIOACTIVITY AREA."

5. Posting of Areas or Rooms in which Licensed Material is Used or Stored. The licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding ~~10~~ ten times the quantity of such material specified in Appendix C of 10 CFR Part 20~~.1001-20.2401, effective January 1, 1994,~~ with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL(S)" or "DANGER, RADIOACTIVE MATERIAL(S)".

(c) Exceptions to Posting Requirements.

1. A licensee is not required to post caution signs in areas or rooms containing sources of radiation for periods of less than ~~8~~ eight hours, if all of the following conditions are met:

   (i) The sources of radiation are constantly attended during these periods by an individual who takes the precautions necessary to prevent the exposure of individuals to sources of radiation in excess of the limits established in this Rule; and

   (ii) The area or room is subject to the licensee's control.

2. Rooms or other areas in hospitals that are occupied by patients are

not required to be posted with caution signs pursuant to (~~11~~12)(b) of this Rule provided that the patient could be released from ~~confinement~~ licensee control pursuant to Rule 391-3-17-.05.

Rule .03(12)(c)3.

3. A room or area is not required to be posted with a caution sign pursuant to (~~11~~12)(b) of this Rule because of the presence of a sealed source provided that the radiation level at 30 centimeters from the surface of the source container or housing does not exceed 0.005 rem (0.05 mSv) per hour.

(d) Labeling Containers and Radiation Machines.

1. The licensee shall ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The label shall also provide information such as the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment, to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

2. Each licensee shall, prior to removal or disposal of empty uncontaminated containers to unrestricted areas, remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive materials.

(e) Exemptions to Labeling Requirements. A licensee is not required to label:

1. Containers holding licensed material in quantities less than the quantities listed in Appendix C of 10 CFR 20 ~~.1001-20.2401, effective January 1, 1994~~;

2. Containers holding licensed material in concentrations less than those specified in Table III of Appendix B of 10 CFR 20 ~~1001-20.2401, effective January 1, 1994~~;

3. Containers attended by an individual who takes the precautions necessary to prevent the exposure of individuals in excess of the limits established by this Rule;

4. Containers when they are in transport and packaged and labeled in

accordance with the regulations of the U.S. Department of Transportation[4];

Rule .03(12)(e)4.

5. Containers that are accessible only to individuals authorized to handle or use them or to work in the vicinity of the containers, if the contents are identified to these individuals by a readily available written record. Examples of containers of this type are containers in locations such as water-filled canals, storage vaults, or hot cells. The record shall be retained as long as the containers are in use for the purpose indicated on the record; or

6. Installed manufacturing or process equipment, such as chemical process equipment, piping, and tanks.

(f) Procedures for Receiving and Opening Packages.

1. Each licensee who is authorized to receive a package containing quantities of radioactive material in excess of a Type A quantity, as defined in Rule 391-3-17-.06(~~23~~)(~~j~~) (u), shall make arrangements to receive:

(i) The package when the carrier offers it for delivery; or

(ii) The notification of the arrival of the package at the carrier's terminal and to take possession of the package expeditiously.

2. Each licensee shall:

(i) Monitor the external surfaces of a labeled[5] package for radioactive contamination unless the package contains only radioactive material in the form of gas or in "special form" as defined in Rule 391-3-17-.01(2)(~~vvvv~~wwww);

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[4] Labeled with a Radioactive White I, Yellow II, or Yellow III label as specified in U.S. Department of Transportation (DOT) regulations, 49 CFR 172.403-172.440.

[5] Labeling of packages containing radioactive materials is required by the U.S. Department of Transportation (DOT) if the amount and type of radioactive material exceeds the limits for an excepted quantity or article as defined and limited by U.S. Department of Transportation (DOT) regulations 49 CFR 173.403(m) and (w) and 173.421-.424.

(ii) Monitor the external surfaces of a labeled package for radiation levels unless the package contains quantities of radioactive material that are less than or equal to the Type A quantity, as defined in Rule 391-3-17-.06 (~~2~~3)(ju), and the radioactive material is in the form of a gas or in special form as defined in Rule 391-3-17-.01(2)(~~vvvvwww~~); and

(iii) Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if the package has evidence of potential contamination, such as packages that are crushed, wet, or damaged.

Rule .03(12)(f)2.

3. The licensee shall perform the monitoring required by (~~1~~112)(f)2. of this Rule as soon as practicable after receipt of the package, but not later than ~~3~~ three hours after the package is received at the licensee's facility if it is received during the licensee's normal working hours, or not later than ~~3~~ three hours from the beginning of the next working day if it is received after working hours.

4. The licensee shall immediately notify the final delivery carrier and the Department by telephone, telegram, mailgram, or facsimile, when:

(i) Removable radioactive surface contamination exceeds the limits of Rule 391-3-17-.06(15)(h); or

(ii) External radiation levels exceed the limits of Rule 391-3-17-.06(15)~~(h)~~ (i).

5. Each licensee shall:

(i) Establish, maintain, and retain written procedures for safely opening packages in which radioactive material is received; and

(ii) Ensure that the procedures are followed and that special instructions for the type of package being opened are followed.

6. Licensees transferring special form sources in vehicles owned or operated by the licensee to and from a work site are exempt from

the contamination monitoring requirements of (~~11~~12)(f)2. of this Rule, but

Rule .03(12)(f)6.

are not exempt from the monitoring requirement in (~~11~~12)(f)2. of this Rule for measuring radiation levels to ensure that the source is still properly lodged in its shield.

(~~12~~13) Waste Disposal

(a) General Requirements.

1. A licensee shall dispose of licensed material only:

(i) By transfer to an authorized recipient as provided in (~~12~~13)(i) of this Rule and in Rule 391-3-17-.02(19), or to the U.S. Department of Energy;

(ii) By decay in storage;

(iii) By release in effluents within the limits in (5)(i) of this Rule; or

(iv) As authorized pursuant to (~~12~~13)(b), (~~12~~13)(c), (~~12~~13)(d), or (~~12~~13)(e) of this Rule.

2. A person shall be specifically licensed by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State, or a Licensing State to receive waste containing licensed material from other persons for:

(i) Treatment prior to disposal;

(ii) Treatment or disposal by incineration;

(iii) Decay in storage;

(iv) Disposal at a land disposal facility licensed pursuant to 10 CFR Part 61, or equivalent regulations of an Agreement State; or

(v) Storage until transferred to a disposal facility authorized to receive the waste.

(b) Method for Obtaining Approval of Proposed Disposal Procedures. A licensee or applicant for a license may apply to the Department for approval of proposed procedures not otherwise authorized in this Chapter to dispose of licensed material generated in the licensee's operations. Each application shall include:

Rule .03(13)(b)

1. A description of the waste containing licensed material to be disposed of, including the physical and chemical properties that have an impact on risk evaluation, and the proposed manner and conditions of waste disposal;

2. An analysis and evaluation of pertinent information on the nature of the environment;

3. The nature and location of other potentially affected facilities; and

4. Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this Rule.

(c) Disposal by Release into Sanitary Sewerage.

1. A licensee may discharge licensed material into sanitary sewerage if each of the following conditions are satisfied:

(i) The material is readily soluble, or is readily dispersible biological material, in water;

(ii) The quantity of licensed radioactive material that the licensee releases into the sewer in ~~1~~ one month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in Table III of Appendix B of 10 CFR 20 ~~1001-20.2401, effective January 1, 1994~~;

(iii) If more than one radionuclide is released, the following conditions must also be satisfied:

(I) The licensee shall determine the fraction of the limit in Table III of Appendix B of 10 CFR 20 .~~1001-20.2401, effective January 1, 1994~~, represented by discharges into sanitary sewerage by dividing the actual monthly

Rule .03(13)(c)1.(iii)(I)

average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in Table III of Appendix B of 10 CFR 20 ~~.1001-20.2401, effective January 1, 1994~~; and

(II) The sum of the fractions for each radionuclide required by (~~1~~213)(c)1.(iii)(I) of this Rule does not exceed unity; and

(iv) The total quantity of licensed radioactive material that the licensee releases into the sanitary sewerage system in a year does not exceed ~~5~~ five Ci (185 GBq) of hydrogen-3,~~1~~ one Ci (37 GBq) of carbon-14, and ~~1~~ one Ci (37 GBq) of all other radioactive materials combined.

2. Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in (~~1~~213)(c)1. of this Rule.

(d) Treatment or Disposal by Incineration. A licensee may treat or dispose of licensed material by incineration only in the forms and concentrations specified in (~~1~~213)(e) of this Rule or as specifically approved by the Department pursuant to (~~1~~213)(b) of this Rule.

(e) Disposal of Specific Wastes.

1. A licensee may dispose of the following licensed material as if it were not radioactive:

(i) 0.05 µCi (1.85 kBq) or less of hydrogen-3, carbon-14, or iodine-125 per gram of medium used for liquid scintillation counting; and

(ii) 0.05 µCi (1.85 kBq) or less of hydrogen-3, carbon-14, or iodine-125 per gram of animal tissue, averaged over the weight of the entire animal.

2. A licensee shall not dispose of tissue under (~~1~~213)(e)1.(ii) of this Rule in a manner that would permit its use either as food for humans or as animal feed.

Rule .03(13)(e)3.

3. The licensee shall maintain records in accordance with (~~13~~14)(i) of this Rule.

(f) Classification of Radioactive Waste for Near-Surface Disposal.

1. Considerations. Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of long-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form, and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form, and disposal methods are effective.

2. Classes of waste.

(i) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in (~~12~~13)(g)1. of this Rule. If Class A waste also meets the stability requirements set forth in (~~12~~13)(g)2. of this Rule, it is not necessary to segregate the waste for disposal.

(ii) Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in (~~12~~13)(g) of this Rule.

(iii) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in (~~12~~13)(g) of this Rule.

Rule .03(13)(f)3.

3. Classification determined by long-lived radionuclides. If the waste contains only radionuclides listed in Table 1, classification shall be determined as follows:

(i) If the concentration does not exceed 0.1 times the value in Table 1, the waste is Class A.

(ii) If the concentration exceeds 0.1 times the value in Table 1, the waste is Class C.

(iii) If the concentration exceeds the value in Table 1, the waste is not generally acceptable for near-surface disposal.

(iv) For wastes containing mixtures of radionuclides listed in Table 1, the total concentration shall be determined by the sum of fractions rule described in (~~1~~213)(f)7. of this Rule.

Table 1

Radionuclide	Concentration Curies/cubic meter
C-14	8
C-14 in activated metal	80
Ni-59 in activated metal	220
Nb-94 in activated metal	0.2
Tc-99	3
I-129	0.08
Alpha-emitting transuranic radionuclides with half-life greater than five years	100 [(a)]
Pu-241	3,500 [(a)]
Cm-242	20,000 [(a)]
Ra-226	100 [(a)]

[(a)] Units are nanocuries per gram.

Rule .03(13)(f)4.

4. Classification determined by short-lived radionuclides. If the waste does not contain any of the radionuclides listed in Table 1, classification shall be determined based on the concentrations

shown in Table 2. If a nuclide is not listed Table 2, it does not need to be considered in determining the waste class.

(i) If the concentration does not exceed the value in Column 1, the waste is Class A.

(ii) If the concentration exceeds the value in Column 1, but does not exceed the value in Column 2, the waste is Class B.

(iii) If the concentration exceeds the value in Column 2, but does not exceed the value in Column 3, the waste is Class C.

(iv) If the concentration exceeds the value in Column 3, the waste is not generally acceptable for near-surface disposal.

(v) For wastes containing mixtures of the radionuclides listed in Table 2, the total concentration shall be determined by the sum of fractions rule described in (~~1~~213)(f)7. of this Rule.

Table 2

Radionuclide	Concentration, Curies/cubic meter Column 1	Column 2	Column 3
Total of all radionuclides with less than ~~5~~ five year half-life	700	(b)	(b)
H-3	40	(b)	(b)
Co-60	700	(b)	(b)
Ni-63	3.5	70	700
Ni-63 in activated metal	35	700	7000
Sr-90	0.04	150	7000
CS-137	1	44	4600

(b) There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other radionuclides in Table 2 determine the waste to be Class C independent of these radionuclides.

Rule .03(13)(f)5.

5. Classification determined by both long- and short-lived radionuclides. If the waste contains a mixture of radionuclides, some of which are listed in Table 1 and some of which are listed in Table 2, classification shall be determined as follows:

(i) If the concentration of a radionuclide listed in Table 1 is less than 0.1 times the value listed in Table 1, the class shall be that determined by the concentration of radionuclides listed in Table 2.

(ii) If the concentration of a radionuclide listed in Table 1 exceeds 0.1 times the value listed in Table 1, the waste shall be Class C, provided the concentration of radionuclides listed in Table 2 does not exceed the value shown in Column 3 of Table 2.

6. Classification of wastes with radionuclides other than those listed in Tables 1 and 2. If the waste does not contain any radionuclides listed in either Table 1 or 2, it is Class A.

7. The sum of the fractions rule for mixtures of radionuclides. For determining classification for waste that contains a mixture of radionuclides, it is necessary to determine the sum of fractions by dividing each radionuclide's concentration by the appropriate limit and adding the resulting values. The appropriate limits must all be taken from the same column of the same table. The sum of the fractions for the column must be less than 1.0 if the waste class is to be determined by that column. Example: A waste contains Sr-90 in a concentration of 50 Ci/m^3 and Cs-137 in a concentration of 22 Ci/m^3. Since the concentrations both exceed the values in Column 1, Table 2, they must be compared to Column 2 values. For Sr-90 fraction, 50/150 = 0.33; for Cs-137 fraction, 22/44 = 0.5; the sum of the fractions = 0.83. Since the sum is less than 1.0, the waste is Class B.

8. Determination of concentrations in wastes. The concentration of a radionuclide may be determined by indirect methods such as the use of scaling factors, which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The concentration of a radionuclide may be averaged over the volume of

Rule .03(13)(f)8.

the waste or weight of the waste if the units are expressed as nanocuries per gram.

(g) Radioactive Waste Characteristics.

1. The following are minimum requirements for all classes of waste and are intended to facilitate handling and provide protection of health and safety of personnel at the disposal site:

(i) Wastes shall be packaged in conformance with the conditions of the license issued to the site operator to which the waste will be shipped. Where the conditions of the site license are more restrictive than the provisions of this Chapter, the site license conditions shall govern.

(ii) Wastes shall not be packaged for disposal in cardboard or fiberboard boxes.

(iii) Liquid waste shall be packaged in sufficient absorbent material to absorb twice the volume of the liquid.

(iv) Solid wastes containing liquid shall contain as little free-standing and non-corrosive liquid as is reasonably achievable, but in no case shall the liquid exceed ~~1%~~ one percent of the volume.

(v) Wastes shall not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures or of explosive reaction with water.

(vi) Wastes shall not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous wastes packaged in accordance with (~~1~~213)(g)1.(viii) of this Rule.

(vii) Pyrophoric materials contained in wastes shall be treated, prepared, and packaged to be nonflammable.

(viii) Wastes in a gaseous form shall be packaged at an absolute
Rule .03(13)(g)1.(viii)

pressure that does not exceed 1.5 atmospheres at 20°C. Total activity shall not exceed 100 Curies (3.7 TBq) per container.

(ix) Wastes containing hazardous, biological, pathogenic, or

infectious material shall be treated to reduce to the maximum extent practicable the potential hazard from the non-radiological materials.

2. The following requirements are intended to provide stability of the waste. Stability is intended to ensure that the waste does not degrade and affect overall stability of the site through slumping, collapse, or other failure of the disposal unit and thereby lead to water infiltration. Stability is also a factor in limiting exposure to an inadvertent ~~an inadvertent~~ intruder, since it provides a recognizable and nondispersible waste

(i) Waste shall have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form under the expected disposal conditions such as the weight of overburden and compaction equipment, the presence of moisture and microbial activity, and internal factors such as radiation effects and chemical changes. Structural stability can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability after disposal.

(ii) Notwithstanding the provisions in (~~12~~13)(g)1.(iii) and (iv) of this Rule, liquid wastes, or wastes containing liquid, shall be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed ~~1%~~ one percent of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5~~%~~ percent of the volume of the waste for waste processed to a stable form.

(iii) Void spaces within the waste and between the waste and its package shall be reduced to the extent practicable.

Rule .03(13)(h)

(h) Labeling. Each package of waste shall be clearly labeled to identify whether it is Class A, Class B, or Class C waste in accordance with (~~12~~13)(f) of this Rule.

(i) Transfer for Disposal and Manifest.

1. A waste generator, collector, or processor who transports, or offers

for transportation, low-level radioactive waste intended for ultimate disposal at a licensed low-level radioactive waste land disposal facility must prepare a Manifest reflecting information requested on applicable NRC Forms 540 or equivalent forms (Uniform Low-Level Radioactive Waste Manifest (Shipping Paper)) and 541 (Uniform Low-Level Radioactive Waste Manifest (Container and Waste Description)) and if necessary, on an applicable NRC Form 542 or equivalent form (Uniform Low-Level Radioactive Waste Manifest (Manifest Index and Regional Compact Tabulation)). NRC Forms 540 and 540A or equivalent forms must be completed and must physically accompany the pertinent low-level radioactive waste shipment. Upon agreement between shipper and consignee, NRC Forms 541 and 541A and 542 and 542A or equivalent forms may be completed, transmitted, and stored in electronic media with the capability for producing legible, accurate, and complete records on the respective forms. Licensees are not required by the Department to comply with the manifesting requirements of this Chapter when they ship:

(i) LLW for processing and expect its return (i.e., for storage under their license) prior to disposal at a licensed land disposal facility;

(ii) LLW that is being returned to the licensee who is the "waste generator" or "generator," as defined in this Rule; or

(iii) Radioactively contaminated material to a "waste processor" that becomes the processor's residual waste.

For guidance in completing these forms, refer to the instructions that accompany the forms. Copies of manifests required by this Rule may be legible carbon copies, photocopies, or computer printouts that reproduce the data in the format of the uniform manifest.

Rule .03(13)(i)1.(iii)

NRC Forms 541 and 541A and 542 and 542A or equivalent forms and the accompanying instructions, in hard copy, may be obtained from Radioactive Materials Program, 4244 International Parkway, Suite 114, Atlanta, Georgia 30354, or current address.

This Rule includes information requirements of the Department of Transportation, as codified in 49 CFR part 172. Information on hazardous, medical, or other waste, required to meet

~~Environmental Protection Agency~~ EPA regulations, as codified in 40 CFR parts 259, 261 or elsewhere, is not addressed in this Rule, and must be provided on the required EPA forms. However, the required EPA forms must accompany the Uniform Low-Level Radioactive Waste Manifest required by this Rule.

2. General Information. The shipper of the low-level radioactive waste, shall provide the following information on the uniform manifest:

   (i) The name, facility address, and telephone number of the licensee shipping the waste;

   (ii) An explicit declaration indicting whether the shipper is acting as a waste generator, collector, processor, or a combination of these identifiers for purposes of the manifested shipment; and

   (iii) The name, address, and telephone number, or the name and EPA identification number for the carrier transporting the waste.

3. Shipment Information. The shipper of the radioactive waste shall provide the following information regarding the waste shipment on the uniform manifest:

   (i) The date of the waste shipment;

   (ii) The total number of packages/disposal containers;

   (iii) The total disposal volume and disposal weight in the shipment;

   (iv) The total radionuclide activity in the shipment.

Rule .03(13)(i)3.(v)

   (v) The activity of each of the radionuclides H-3, C-14, Tc-99, and I-129 contained in the shipment; and

   (vi) The total masses of U-233, U-235, and plutonium in the form of special nuclear material, and the total mass of uranium and thorium in the form of source material.

4. Disposal Container and Waste Information. The shipper of the

radioactive waste shall provide the following information on the uniform manifest regarding the waste and each disposal container of waste in the shipment:

(i) An alphabetic or numeric identification that uniquely identifies each disposal container in the shipment;

(ii) A physical description of the disposal container, including the manufacturer and model of any high integrity container;

(iii) The volume displaced by the disposal container;

(iv) The gross weight of the disposal container, including the waste;

(v) For waste consigned to a disposal facility, the maximum radiation level at the surface of each disposal container;

(vi) A physical and chemical description of the waste;

(vii) The total weight percentage of chelating agent for any waste containing more than 0.1% percent chelating agent by weight, plus the identify of the principal chelating agent;

(viii) The approximate volume of waste within a container;

(ix) The sorbing or solidification media, if any, and the identity of the solidification media vendor and brand name;

(x) The identities and activities of individual radionuclides contained in each container, the masses of U-233, U-235, and plutonium in the form of special nuclear material, and the

Rule .03(13)(i)4.(x)

masses of uranium and thorium in the form of source material. For discrete waste types (i.e., activated materials, contaminated equipment, mechanical filters, sealed source/devices, and wastes in solidification/stabilization media), the identities and activities of individual radionuclides associated with a disposal container shall be reported;

(xi) The total radioactivity within each container; and

(xii) For wastes consigned to a disposal facility, the classification of the waste pursuant to (12)(f). Waste not meeting the structural stability requirements of (12)(g)2. must be identified.

5. Uncontainerized Waste Information. The shipper of the radioactive waste shall provide the following information on the uniform manifest regarding a waste shipment delivered without a disposal container:

(i) The approximate volume and weight of the waste;

(ii) A physical and chemical description of the waste;

(iii) The total weight percentage of chelating agent if the chelating agent exceeds 0.1~~%~~ percent by weight, plus the identity of the principal chelating agent;

(iv) For waste consigned to a disposal facility, the classification of the waste pursuant to (~~12~~13)(f) of this Rule. Waste not meeting the structural stability requirements of (~~12~~13)(g)2. of this Rule must be identified;

(v) The identities and activities of individual radionuclides contained in the waste, the masses of U-233, U-235, and plutonium in the form of special nuclear material, and the masses of uranium and thorium in the form of source material; and

(vi) For wastes consigned to a disposal facility, the maximum radiation levels at the surface of the waste.

6. Multi-Generator Disposal Container Information. This section Rule .03(13)(i)6.

applies to disposal containers enclosing mixtures of waste originating from different generators. (Note: The origin of the LLW resulting from a processor's activities may be attributable to one or more "generators" (including "waste generators") as defined in this Chapter). It also applies to mixtures of wastes shipped in an uncontainerized form, for which portions of the mixture within the shipment originate from different generators.

(i) For homogeneous mixtures of waste, such as incinerator ash, provide the waste description applicable to the mixture and the volume of the waste attributed to each generator.

(ii) For heterogeneous mixtures of waste, such as the combined products from a large compactor, identify each generator contributing waste to the disposal container, and, for discrete waste types (i.e., activated materials, contaminated equipment, mechanical filters, sealed source/devices, and wastes in solidification/stabilization media), the identities and activities of individual radionuclides contained on these waste types within the disposal container. For each generator, provide the following:

(I) The volume of waste within the disposal container;

(II) A physical and chemical description of the waste, including the solidification agent, if any;

(III) The total weight percentage of chelating agents for any disposal container containing more than 0.1% percent chelating agent by weight, plus the identity of the principal chelating agent;

(IV) The sorbing or solidification media, if any, and the identity of the solidification media vendor and brand name if the media is claimed to meet stability requirements of (~~1~~213)(g)2. of this Rule; and

(V) Radionuclide identities and activities contained in the waste, the masses of U-233, U-235, and plutonium in the form of special nuclear material, and the masses of

Rule .03(13)(i)6.(ii)(V)

uranium and thorium in the form of source material if contained in the waste.

7. An authorized representative of the waste generator, processor, or collector shall certify by signing and dating the shipment manifest that the transported materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Department. A collector in signing the certification is certifying that nothing has been done to

the collected waste which would invalidate the waste generator's certification.

8. Control and Tracking. Any licensee who transfers radioactive waste to a land disposal facility or a licensed waste collector shall comply with all of the following requirements. Any licensee who transfers waste to a licensed waste processor for waste treatment or repackaging shall comply with the requirements of (~~12~~13)(i)8.(iv) through (ix). A licensee shall:

(i) Prepare all wastes so that the waste is classified according to (~~12~~13)(f) and meets waste characteristics requirements in (~~12~~13)(g);

(ii) Label each disposal container (or transport package if potential radiation hazards preclude labeling of the individual disposal container) of waste to identify whether it is Class A waste, Class B waste, Class C waste, or greater than Class C waste, in accordance with (~~12~~13)(f);

(iii) Conduct a quality assurance program to assure compliance with (~~12~~13)(f) and (~~12~~13)(g) (the program must include management evaluation of audits);

(iv) Prepare the NRC Forms 540 and 540A or Equivalent Forms, "Uniform Low-Level Radioactive Waste Manifest" as required by this Section;

(v) Forward a copy or electronically transfer the Uniform Low-Level Radioactive Waste Manifest to the intended consignee so that either:

Rule .03(13)(i)8.(v)(I)

(I) Receipt of the manifest precedes the LLW shipment, or

(II) The manifest is delivered to the consignee with the waste at the time the waste is transferred to the consignee, or

(III) Both (I) and (II) is also acceptable.

(vi) Include NRC Form 540 (and NRC 540A, if required) or Equivalent Forms with the shipment regardless of the option

in (~~1~~213)(i)8.(v);

(vii) Receive acknowledgment of the receipt of the shipment in the form of a signed copy of NRC Form 540 or Equivalent Form;

(viii) Retain a copy of or electronically store the Uniform Low-Level Radioactive Waste Manifest and documentation of acknowledgment of receipt as the record of transfer of licensed material as required by Rule 391-3-17-.02; and

(ix) For any shipments or any part of a shipment for which acknowledgment of receipt has not been received within the times set forth in this section, conduct an investigation in accordance with (~~1~~213)(i)12.

9. Any waste collector licensee who handles only prepackaged waste shall:

(i) Acknowledge receipt of the waste from the shipper within one week of receipt by returning a signed copy of NRC Form 540 or Equivalent Form.

(ii) Prepare a new manifest to reflect consolidated shipments that meet the requirements of this section. The waste collector shall ensure that, for each container of waste in the shipment, the manifest identifies the generator of that container of waste;

(iii) Forward a copy or electronically transfer the Uniform Low-Level Radioactive Waste Manifest to the intended consignee so that either:

Rule .03(13)(i)9.(iii)(I)

(I) Receipt of the manifest precedes the LLW shipment, or

(II) The manifest is delivered to the consignee with the waste at the time the waste is transferred to the consignee, or

(III) Both (I) and (II) is also acceptable;

(iv) Include NRC Form 540 (and NRC From 540A, if required) or

Equivalent Forms, with the shipment regardless of the option chosen in (~~12~~13)(i)9.(iii);

(v) Receive acknowledgment of the receipt of the shipment in the form of a signed copy of NRC Form 540 or Equivalent Form;

(vi) Retain a copy of or electronically store the Uniform Low-Level Radioactive Waste Manifest and documentation of acknowledgment of receipt;

(vii) For any shipments or any part of a shipment for which acknowledgment of receipt has not been received within the times set forth in this section, conduct an investigation in accordance with (~~12~~13)(i)12.; and

(viii) Notify the shipper and the Department when any shipment, or part of a shipment, has not arrived within 60 days after receipt of an advance manifest, unless notified by the shipper that the shipment has been canceled.

10. Any licensed waste processor who treats or repackages waste shall:

(i) Acknowledge receipt of the waste from the shipper within one week of receipt by returning a signed copy of NRC Form 540 or Equivalent Form;

(ii) Prepare a new manifest that meets the requirements of this section. Preparation of the new manifest reflects that the processor is responsible for meeting these requirements. For each container of waste in the shipment, the manifest shall identify the waste generators, the preprocessed waste volume,

Rule .03(13)(i)10.(ii)

and other information as required in (~~12~~13)(i)6.;

(iii) Prepare all wastes so that the waste is classified according to (~~12~~13)(f) and meets the waste characteristics requirements in (~~12~~13)(g);

(iv) Label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with

(~~1~~2~~1~~3)(f) and (~~1~~2~~1~~3)(h);

(v) Conduct a quality assurance program to assure compliance with (~~1~~2~~1~~3)(f) and (~~1~~2~~1~~3)(g) (the program shall include management evaluation of audits);

(vi) Forward a copy or electronically transfer the Uniform Low-Level Radioactive Waste Manifest to the intended consignee so that either:

(I) Receipt of the manifest precedes the LLW shipment, or

(II) The manifest is delivered to the consignee with the waste at the time the waste is transferred to the consignee, or

(III) Both (I) and (II) is also acceptable;

(vii) Include NRC Form 540 (and NRC Form 540A if required) or Equivalent Forms, with the shipment regardless of the option chosen in (~~1~~2~~1~~3)(i)10.(vi);

(viii) Receive acknowledgment of the receipt of the shipment in the form of a signed copy of NRC Form 540 or Equivalent Form;

(ix) Retain a copy of or electronically store the Uniform Low-Level Radioactive Waste Manifest and documentation of acknowledgment of receipt as the record of transfer of licensed material as required by Rule 391-3-17-.02;

(x) For any shipment or any part of a shipment for which acknowledgment of receipt has not been received within the

Rule .03(13)(i)10.(x)

times set forth in this section, conduct an investigation in accordance with (~~1~~2~~1~~3)(i)12.; and

(xi) Notify the shipper and the Department when any shipment, or any part of a shipment, has not arrived within 60 days after receipt of an advance manifest, unless notified by the shipper that the shipment has been canceled.

11. The land disposal facility operator shall:

(i) Acknowledge receipt of the waste within one week of receipt by returning, as a minimum, a signed copy of NRC Form 540 or Equivalent Form to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the operator. If any discrepancy exists between materials listed on the Uniform Low-Level Radioactive Waste Manifest and materials received, copies or electronic transfer of the affected forms must be returned indicating that discrepancy.

(ii) Maintain copies of all completed manifests and electronically store the information until the Department terminates the license; and

(iii) Notify the shipper and the Department when any shipment, or part of a shipment, has not arrived within 60 days after receipt of an advance manifest, unless notified by the shipper that the shipment has been canceled.

12. Any shipments or part of a shipment for which acknowledgment is not received within the times set forth in this section must:

(i) Be investigated by the shipper if the shipper has not received notification or receipt within 20 days after transfer; and

(ii) Be traced and reported. The investigation shall include tracing the shipment and filing a report with the Department. Each licensee who conducts a trace investigation shall file a written report with the Department within ~~2~~ two weeks of completion of the investigation.

Rule .03(13)(j)

(j) Compliance with Environmental and Health Protection Regulations. Nothing in this Rule relieves the licensee from complying with other applicable Federal, State, and local regulations governing other toxic or hazardous properties of materials which may be disposed of pursuant to this Rule.

(~~1~~314) Records

(a) General Provisions.

1. Each licensee shall use the ~~special~~ units of Ceurie, rad, and rem, ~~and Roentgen~~, including multiples and subdivisions ~~or the SI units of becquerel, Gray, Sievert and Coulomb per kilogram,~~ and shall clearly indicate the units of all quantities on records required by this Rule.

2. In the records required by this rule, the licensee may record quantities in SI units in parentheses following each of the units specified in (14)(a)1. However, all quantities must be recorded as stated in (14)(a)1.

~~2.~~3. The licensee shall make a clear distinction among the quantities entered on the records required by this Rule, such as total effective dose equivalent, shallow dose equivalent, lens dose equivalent, deep dose equivalent, total organ dose equivalent, or committed effective dose equivalent.

(b) Records of Radiation Protection Programs.

1. Each licensee shall maintain records of the Radiation Protection Program required pursuant to (4) of this Rule, including:

(i) The provisions of the Program; and

(ii) Audits and other reviews of Program content and implementation.

2. The licensee shall retain the records required by (~~13~~14 3)(b)1.(i) of this Rule until the Department terminates each pertinent license requiring the record. The licensee shall retain each of the records required by (~~13~~14)(b)1.(ii) of this Rule for ~~3~~ three years after the record is made.

Rule .03(14)(c)

(c) Records of Surveys.

1. Each licensee shall maintain records showing the results of surveys and calibrations required by (~~7~~8)(a) and (~~11~~12)(f)2. of this Rule. The licensee shall retain each of these records for ~~3~~ three years after the record is made.

2. The licensee shall retain each of the following records until the Department terminates each pertinent license requiring the record:

(i) Records of the results of surveys to determine the dose from external sources of radiation used, in the absence of or in combination with individual monitoring data, in the assessment of individual dose equivalents;

(ii) Records of the results of measurements and calculations used to determine individual intakes of radioactive material and used in the assessment of internal dose;

(iii) Records showing the results of air sampling, surveys, and bioassays required pursuant to (~~9~~10)(~~e~~d)1.(iii)(I) and (II) of this Rule; and

(iv) Records of the results of measurements and calculations used to evaluate the release of radioactive effluents to the environment.

3. Upon termination of the license, the licensee shall permanently store records on Department Form "Occupational Radiation Exposure History" or equivalent or shall make provision with the Department for their transfer to the Department.

(d) Records of Tests for Leakage or Contamination of Sealed Sources. Records of tests for leakage or contamination of sealed sources required by (6) of this Rule shall be kept in units of microcuries or becquerels and maintained for inspection by the Department for ~~3~~ three years after the record is made.

(e) Records of Prior Occupational Dose.

Rule .03(14)(e)1.

1. The licensee shall retain the records of prior occupational dose and of exposure history as specified in (5)(e) of this Rule on Department Form "Occupational Radiation Exposure History" or equivalent until the Department terminates each pertinent license requiring this record. The licensee shall retain records used in preparing Department Form "Occupational Radiation Exposure History" for ~~3~~ three years after the record is made.

2. Upon termination of the license, the licensee shall permanently store records on Department Form "Occupational Radiation Exposure History" or equivalent or shall make provision with the

Department for their transfer to the Department.

(f) Records of Planned Special Exposures.

1. For each use of the provisions of (5)(e) of this Rule for planned special exposures, the licensee shall maintain records that describe:

(i) The exceptional circumstances requiring the use of a planned special exposure;

(ii) The name of the management official who authorized the planned special exposure and a copy of the signed authorization;

(iii) What actions were necessary;

(iv) Why the actions were necessary;

(v) What precautions were taken to assure that doses were maintained ALARA;

(vi) What individual and collective doses were expected to result; and

(vii) The doses actually received in the planned special exposure.

2. The licensee shall retain the records until the Department terminates each pertinent license requiring these records.

Rule .03(14)(f)3.

3. Upon termination of the license, the licensee shall permanently store records on Department Form "Occupational Radiation Exposure History" or equivalent or shall make provision with the Department for their transfer to the Department.

(g) Records of Individual Monitoring Results.

1. Record-keeping Requirement. Each licensee shall maintain records of doses received by all individuals for whom monitoring was required pursuant to (~~7~~8)(b) of this Rule and records of doses received during planned special exposures, accidents, and

emergency conditions. Assessments of dose equivalent and records made using units in effect before January 1, 1994, need not be changed. These records shall include when applicable:

(i) The deep dose equivalent to the whole body, ~~eye~~ lens dose equivalent, shallow dose equivalent to the skin, and shallow dose equivalent to the extremities;

(ii) The estimated intake ~~or body burden~~ of radionuclides (see (5)(b) of this Rule);

(iii) The committed effective dose equivalent assigned to the intake ~~or body burden~~ of radionuclides;

(iv) The specific information used to calculate the committed effective dose equivalent pursuant to (5)(d)3. of this Rule;

(v) The total effective dose equivalent when required by (5)(b) of this Rule; and

(vi) The total of the deep dose equivalent and the committed dose to the organ receiving the highest total dose.

2. Record-keeping Frequency. The licensee shall make entries of the records specified in (~~13~~14)(g)1. of this Rule at intervals not to exceed one year.

3. Record-keeping Format. The licensee shall maintain the records specified in (~~13~~14)(g)1. of this Rule on Department Form Rule .03(14)(g)3.

"Occupational Radiation Exposure History" in accordance with the instructions or in clear and legible records containing all the information required by the Department Form.

4. The licensee shall maintain the records of dose to an embryo/fetus with the records of dose to the declared pregnant woman. The declaration of pregnancy, including the estimated date of conception, shall also be kept on file, but may be maintained separately from the dose records.

5. The licensee shall retain each required form or record until the Department terminates each pertinent license requiring the record.

6. Upon termination of the license, the licensee shall permanently store records on Department Form "Occupational Radiation Exposure History" or equivalent or shall make provisions with the Department for their transfer to the Department.

7. Privacy Protection. The records required pursuant to (~~13~~14)(g) should be protected from public disclosure because of their personal privacy nature.

(h) Records of Dose to Individual Members of the Public.

1. Each licensee shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public. See (5)(i) of this Rule.

2. The licensee shall retain the records required by (~~13~~14)(h)1. of this Rule until the Department terminates each pertinent license requiring the record.

(i) Records of Waste Disposal.

1. Each licensee shall maintain records of the disposal of licensed materials made pursuant to (~~12~~13)(b), (~~12~~13)(c), (~~12~~13)(d), and (~~12~~13)(e) of this Rule and of disposal of licensed materials by burial

Rule .03(14)(i)1.

in soil, including burials authorized before July 12, 1982.[6]

2. The licensee shall retain the records required by (~~13~~14)(i) of this Rule until the Department terminates each pertinent license requiring the record.

(j) Records of Testing Entry Control Devices for Very High Radiation Areas.

1. Each licensee shall maintain records of tests made on entry control devices for very high radiation areas. These records must include

[6] A previous Rule, .03(5)(d), permitted burial of small quantities of licensed materials in soil before July 12, 1982, without specific Department authorization.

the date, time, and results of each such test of function.

2. The licensee shall retain the records required by (~~13~~14)(j)1. of this Rule for ~~3~~ three years after the record is made.

(k) Form of Records. Each record required by this Rule shall be legible throughout the specified retention period. The record shall be the original or a reproduced copy or a microform, provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period; or the record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records, such as letters, drawings, and specifications, shall include all pertinent information, such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

(~~1~~415) Reports

(a) Reports of Stolen, Lost, or Missing Licensed Sources of Radiation.

1. Telephone . Each licensee shall report to the Department by telephone as follows:

(i) Immediately after its occurrence becomes known to the licensee, stolen, lost, or missing licensed radioactive material in an aggregate quantity equal to or greater than 1,000 times

Rule .03(15)(a)1.(i)

the quantity specified in Appendix C of 10 CFR 20.~~1001-20.2401, effective January 1, 1994~~, under such circumstances that it appears to the licensee that an exposure could result to individuals in unrestricted areas; or

(ii) Within 30 days after its occurrence becomes known to the licensee, lost, stolen or missing licensed radioactive material in an aggregate quantity greater than ~~10~~ ten times the quantity specified in Appendix C of 10 CFR 20.~~1001-20.2401, effective January 1, 1994~~, that is still missing.

2. Written . Each licensee who is required to make a report pursuant to (~~1~~415)(a)1. of this Rule shall, within 30 days after making the

telephone report, make a written report to the Department setting forth the following information:

(i) A description of the licensed source of radiation involved, including, for radioactive material, the kind, quantity, and chemical and physical form;

(ii) A description of the circumstances under which the loss or theft occurred;

(iii) A statement of disposition, or probable disposition, of the licensed material or source of radiation involved;

(iv) Exposures of individuals to radiation, the circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas;

(v) Actions that have been taken, or will be taken, to recover the source of radiation; and

(vi) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of licensed sources of radiation.

3. Subsequent to filing the written report, the licensee shall also report additional substantive information on the loss or theft within 30 days after the licensee learns of such information.

Rule .03(15)4.

4. The licensee shall prepare any report filed with the Department pursuant to (~~1~~415)(a) of this Rule so that names of individuals who may have received exposure to radiation are stated in a separate and detachable portion of the report.

(b) Notification of Incidents.

1. Immediate notification. Each licensee shall:

(i) Notify the Department as soon as possible but not later than 4 four hours after the discovery of an event that prevents immediate protective actions necessary to avoid exposures to radiation or radioactive materials that could exceed regulatory limits or releases of licensed material that could exceed regulatory limits (events may include fires,

explosions, toxic gas releases, etc.).

(ii) Notwithstanding any other requirements for notification, immediately report, to the Department, any event involving radioactive material or sources of radiation possessed by the licensee that may have caused or threatens to cause any of the following conditions:

(I) An individual to receive:

I. A total effective dose equivalent of 25 rems (0.25 Sv) or more; or

II. An ~~eye~~ lens dose equivalent of 75 rems (0.75 Sv) or more; or

III. A shallow-dose equivalent to the skin or extremities of 250 rads (2.5 Gy) or more; or

(II) The release of radioactive material, inside or outside a restricted area, so that had an individual been present for 24 hours, the individual could have received an intake five times the annual limit on intake (the provisions of this paragraph do not apply to locations where personnel are not normally stationed during

Rule.03(15)(b)1.(ii)(II)

routine operations, such as hot cells or process enclosures).

2. Twenty-four hour report. Each licensee shall notify the Department within 24 hours after the discovery of any of the following events involving licensed material:

(i) An unplanned contamination event that:

(I) Requires access to the contaminated area, by workers or the public, to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area;

(II) Involves a quantity of material greater than five times the lowest annual limit on intake specified in

Aappendix B of ~~Sections 20.1001-20.2401 of~~ 10 CFR Ppart 20 for the material; and

(III) Has access to the area restricted for a reason other than to allow isotopes with a half-life of less than 24 hours to decay prior to decontamination.

(ii) An event in which equipment is disabled or fails to function as designed when:

(I) The equipment is required by regulation or license condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident;

(II) The equipment is required to be available and operable when it is disabled or fails to function; and

(III) No redundant equipment is available and operable to perform the required safety function.

(iii) An event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive

Rule .03(15)(b)2.(iii)

contamination on the individual's clothing or body;

(iv) An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed material when:

(I) The quantity of material involved is greater than five times the lowest annual limit on intake specified in Aappendix B ~~of Sections 20.1001-20.2401~~ of 10 CFR Ppart 20 for the material; and

(II) The damage affects the integrity of the licensed material or its container.

3. Preparation and submission of reports. Reports made by licensees in response to the requirements of this section must be made as follows:

(i) Licensees shall make required by (~~1~~415)(b)(1.) and (2.) by telephone to the Department. To the extent that the information is available at the time of notification, the information provided in these must include:

(I) The caller's name and call back telephone number;

(II) A description of the event, including date and time;

(III) The exact location of the event;

(IV) The isotopes, quantities, and chemical and physical form of the licensed material involved; and

(V) Any personnel radiation exposure data available.

(ii) Written report. Each licensee who makes a report required by (~~1~~415)(b)(1) and (2) shall submit a written follow-up report within 30 days of the initial report. Written prepared pursuant to other regulations may be submitted to fulfill this requirement if the contain all of the necessary information and the appropriate distribution is made. These written must be sent

Rule .03(15)(b)3.(ii)

to the Radioactive Materials Program, 4244 International Parkway, Suite 114, Atlanta, Georgia 30354 or current mailing address. The must include the following:

(I) A description of the event, including the probable cause and the manufacturer and model number (if applicable) of any equipment that failed or malfunctioned;

(II) The exact location of the event;

(III) The isotopes, quantities, and chemical and physical form of the licensed material involved;

(IV) Date and time of the event;

(V) Corrective actions taken or planned and the results of any evaluations or assessments; and

(VI) The extent of exposure of individuals to radiation or to

radioactive materials.

4. The licensee shall prepare each report filed with the Department pursuant to (~~1~~415)(b) of this Rule so that names of individuals who have received exposure to sources of radiation are stated in a separate and detachable portion of the report.

5. Licensees shall make the required by (~~1~~415)(b)1. and 2. of this Rule by telephone to the Department, and shall confirm the initial contact by telegram, mailgram, or facsimile to the Department.

6. The provisions of (~~1~~415)(b) of this Rule do not apply to doses that result from planned special exposures, provided such doses are within the limits for planned special exposures and are reported pursuant to (~~1~~415)(d) of this Rule.

(c) Reports of Exposures, Radiation Levels, and Concentrations of Radioactive Material Exceeding the Limits.

1. Reportable Events. In addition to the notification required by (~~1~~415)(b) of this Rule, each licensee shall submit a written report to the Department within 30 days after learning of any of the following occurrences:

Rule .03(15)(c)1.(i)

(i) Incidents for which notification is required by (~~1~~415)(b) of this Rule;

(ii) Doses in excess of any of the following:

(I) The occupational dose limits for adults in (5)(a) of this Rule;

(II) The occupational dose limits for a minor in (5)(g) of this Rule;

(III) The limits for an embryo/fetus of a declared pregnant woman in (5)(h) of this Rule;

(IV) The limits for an individual member of the public in (5)(i) of this Rule; ~~or~~

(V) Any applicable limit in the license; or

(VI) The ALARA constraints for air emissions established under .03(4)(d).

(iii) Levels of radiation or concentrations of radioactive material in:

(I) A restricted area in excess of applicable limits in the license; or

(II) An unrestricted area in excess of ~~10~~ ten times the applicable limit set forth in this Rule or in the license, whether or not the exposure of any individual in excess of the limits in (5)(i) of this Rule is involved; or

(iv) For licensees subject to the provisions of U.S. Environmental Protection Agency's generally applicable environmental radiation standards in 40 CFR 190, levels of radiation or releases of radioactive material in excess of those standards, or of license conditions related to those standards[7].

Rule .03(15)(c)2.

2. Contents of Reports.

(i) Each report required by (~~1~~415)(c)1. of this Rule shall describe the extent of exposure of individuals to radiation and radioactive material, including, as appropriate:

(I) Estimates of each individual's dose;

(II) The levels of radiation and concentrations of radioactive material involved;

(III) The cause of the elevated exposures, dose rates, or concentrations; and

(IV) Corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, ALARA

[7] For purposes of these Regulations, the U.S. Environmental Protection Agency Standards apply only to source material mills and nuclear power plants.

constraints, generally applicable environmental standards, and associated license conditions.

(ii) Each report filed pursuant to (14)(c)1. of this Rule shall include for each occupationally exposed individual ~~exposed~~: the name, Social Security account number, and date of birth. With respect to the limit for the embryo/fetus in (5)(h) of this Rule, the identification should be that of the declared pregnant woman. The report shall be prepared so that this information is stated in a separate and detachable portion of the report.

3. All licensees who make pursuant to (~~1~~415)(c)1. of this Rule shall submit the report in writing to the Department.

(d) of Planned Special Exposures. The licensee shall submit a written report to the Department within 30 days following any planned special exposure conducted in accordance with (5)(f) of this Rule, informing the Department that a planned special exposure was conducted and indicating the date that the planned special exposure occurred and the information required by (~~1~~314)(g)of this Rule.

(e) to Individuals of Exceeding Dose Limits. When a licensee is required, pursuant to the provisions of (~~1~~415)(c),(~~1~~415)(d), or (~~1~~415)(f), to report to the Department any exposure of an identified occupationally exposed individual,

Rule .03(15)(e)

or an identified member of the public to radiation or radioactive material, the licensee shall also provide a copy of the report submitted to the Department to the individual. This report must be transmitted at a time no later than the transmittal to the Department.

~~(f) of Individual Monitoring.~~

~~1. This section applies to each person licensed by the Department to:~~

~~(i) Possess or use sources of radiation for purposes of industrial radiography pursuant to 391-3-17-.04; or~~

~~(ii) Possess or use at any time, for processing or manufacturing for distribution, pursuant to 391-3-17-.02, radioactive material in quantities exceeding any one of the following quantities:~~

Radionuclide	Activity[c] Ci	GBq
Cesium-137	1	37
Cobalt-60	1	37
Gold-198	100	3,700
Iodine-131	1	37
Iridium-192	10	370
Krypton-85	1,000	37,000
Promethium-147	10	370
Technetium- 99m	1,000	37,000

[c]The Department may require, as a license condition, or by Rule, Regulation, or Order pursuant to 391-3-17-.11, from licensees who are licensed to use radionuclides not on this list in quantities sufficient to cause comparable radiation levels.

2. Each licensee in a category listed in (14)(f)1. of this Rule shall submit an annual report of the results of individual monitoring carried out by the licensee or of each individual for whom monitoring was required by (7)(b) of this Rule during that year. The licensee may include additional data for individuals for whom monitoring was provided but not required.

Rule .03(15)(f)

3. The licensee shall file the report required by (14)(c)2. covering the preceding year on or before April 30 of each year. The licensee shall submit the report to the Department.

(g)(f) Notifications and to Individuals.

1. Requirements for notification and to individuals of exposure to radiation or radioactive material are specified in Rule 391-3-17-.07(4) of this Chapter.

2. When a licensee is required pursuant to (14)15)(c) of this Rule to report to the Department any exposure of an individual to radiation or radioactive material, the licensee shall also notify the individual. Such notice shall be transmitted at a time not later than the transmittal to the Department, and shall comply with the provisions of Rule 391-3-17-.07(4)(a) of this Chapter.

(h)(g) of Leaking or Contaminated Sealed Sources. If the test for leakage or

contamination required pursuant to Rule .03(6) ~~of this Rule~~ indicates that the sealed source is leaking or contaminated, a report of the test shall be filed within ~~5~~ five days with the Department describing the equipment involved, the test results, and the corrective action taken.

~~(i)~~(h) and Requirements for Well-logging Operations Using Sealed Sources.

1. A licensee may perform well-logging operations with a sealed source only after the licensee executes a written agreement with the well owner or operator that, within thirty ~~(30)~~ days after a well-logging source has been classified as irretrievable, the following requirements will be implemented:

(i) Each irretrievable well-logging source must be immobilized and sealed in place with a cement plug;

(ii) A whipstock or other deflection device must be set at some point in the well above the cement plug, unless the cement plug and source are not accessible to any subsequent drilling operations;

(iii) A permanent identification plaque, constructed of long lasting material such as stainless steel, brass, bronze, or monel, must

Rule .03(15)(h)1.(iii)

be mounted at the surface of the well, unless the mounting of the plaque is not practical. The plaque must contain:

(I) The word "CAUTION";

(II) A radiation symbol (the color requirement need not be met);

(III) The date the source was abandoned;

(IV) The name of the well owner or well operator;

(V) The well name and well identification number(s) or other designation;

(VI) An identification of the sealed source(s) by radionuclide and quantity of activity;

(VII) The depth of the source and depth to the top of the plug; and

(VIII) An appropriate warning.

2. When a well-logging source becomes irretrievable, the licensee shall:~~(i)~~ Notify, by telephone, the Georgia Department of Natural Resources~~, 205 Butler Street, Atlanta, Georgia 30334, of~~ giving the circumstances of the loss ~~by telephone~~ that resulted in the inability to retrieve the source; and

(~~iii~~) Request ~~Obtain~~ approval to implement abandonment procedures, or

(ii) That the licensee implemented abandonment before receiving Department approval because the licensee believed there was an immediate threat to public health and safety.

3. The licensee shall, within 30 days after a well-logging source has been classified as irretrievable, make a report in writing to the Georgia Department of Natural Resources, Radioactive Materials Program, 4244 International Parkway, Suite 114, Atlanta, Georgia 30354 or current address. The licensee shall send a copy of the

Rule .03(15)(h)3.

report to each appropriate State agency that has authority over the particular well-drilling operation. The report must contain the following information:

(i) Date of occurrence;

(ii) A description of the irretrievable well-logging source involved including radionuclide, quantity and chemical and physical form;

(iii) Surface location and identification of well;

(iv) Results of efforts to immobilize and seal the source in place;

(v) Depth of source;

(vi) Depth of the top of the cement plug;

(vii) Depth of the well; ~~and~~

(viii) Any other information (e.g., warning statement) contained on the permanent identification plaque;

(ix) The immediate threat to public health and safety justification for implementing abandonment if prior Department approval was not obtained in accordance with Rule .03(15)(h)2.(iii);

(x) Any other information, such as a warning statement, contained on the permanent identification plaque; and

(xi) State and Federal agencies receiving copies of this report.

(~~15~~16) Exemptions and Additional Requirements

(a) Vacating Premises. Each specific licensee shall, no less than 30 days before vacating or relinquishing possession or control of premises which may have been contaminated with radioactive material as a result of his activities, notify the Department in writing of his intent to vacate. When deemed necessary by the Department, the licensee shall decontaminate the premises in such a manner as the Department may specify.

Rule .03(16)(b)

(b) Orders. The Department may, by order, impose upon any licensee such requirements, issued in furtherance of this rule, as it deems appropriate or necessary to protect health or minimize danger to life or property.

Authority O.C.G.A. 31-13-1 et. seq; Ga. L. 1964, pp. 499, 507, 566-575, as amended (Georgia Radiation Control Act)

391-3-17-.04 SPECIAL RADIATION SAFETY REQUIREMENTS FOR INDUSTRIAL RADIOGRAPHIC OPERATIONS. AMENDED.

(1) ~~General.~~ Purpose.

~~(a)~~ ~~Purpose.~~ —The provisions of this Rule establish radiation safety requirements and certification procedures for persons utilizing radioactive materials for industrial radiography. Each licensee and certificate holder is responsible for ensuring compliance with these Rules, his license conditions, and Orders of the Department. Each licensee and certificate holder is also responsible for ensuring that persons performing activities under a license comply with the Rules, license conditions, and Orders of the Department. ~~The provisions of this Rule are in addition to and not a substitution for the other requirements of this Chapter.~~

(2) ~~(b)~~ Scope.

(a) The provisions of this Rule are in addition to and not a substitution for the other requirements of this Chapter. The provisions of this Rule apply to all licensees who use radioactive materials for industrial radiography; provided, however, that nothing in this Rule shall apply to the use of radioactive materials in the healing arts.

(b) The licensee shall inform the Department within three days of work to be performed at temporary job sites within the State of Georgia. If the licensee was not given three days notice for a particular job site the licensee shall provide notification to the Department prior to starting work at the site. The following information is required in the notification: the location of the job site; the employing company; a point of contact for the employing company; the dates of the job; and the starting and ending times on the job site.

~~(2)~~(3) Definitions. The definitions set forth for certain terms in Rule 391-3-17-.01 are applicable to those terms as used in this Rule. The following additional definitions also apply:

(a) "Annual refresher safety training" means a review conducted or provided by the licensee for its employees on radiation safety aspects of industrial radiography. The review shall include, as a minimum, any results of internal inspections, new procedures or equipment, new or revised regulations, and accidents or errors that have been observed. The review shall also provide opportunities for employees to ask safety questions.

Rule.04(3)(b)

~~(a)~~(b) "ANSI" means American National Standards Institute.

(c) "Associated equipment" means equipment that is used in conjunction with a radiographic exposure device to make radiographic exposures that drives, guides, or comes in contact with the source. (e.g., guide tube, control tube, control (drive) cable, removable source stop, "J" tube and collimator when used as an exposure head.)

~~(b)~~(d) "Cabinet radiography" means industrial radiography conducted in an enclosure or cabinet so shielded that radiation levels at every location on the exterior meet the conditions specified in Rule 391-3-17-.03(5)(i).

(e) "Certifying entity" means an independent certifying organization meeting the requirements in Appendix A of this Rule or an Agreement State or Licensing State regulatory program meeting the requirements in Appendix A, Parts II and III of this Rule.

~~(c)~~(f) "Collimator" means a device used to limit the size, shape, and direction of the primary beam of radiation.

(g) "Control cable" means the cable that is connected to the source assembly and used to drive the source to and from the exposure location.

(h) "Control drive mechanism" means a device that enables the source assembly to be moved into and out of the exposure device.

(i) "Control tube" means a protective sheath for guiding the control cable. The control tube connects the control drive mechanism to the radiographic exposure device.

~~(d)~~(j) "Enclosed radiography" means industrial radiography conducted in an enclosed cabinet or room and includes cabinet radiography and shielded room radiography.

(k) "Exposure head" means a device that locates the gamma radiography sealed source in the selected working position. An exposure head is also known as a source stop.

(l) "Field station" means a facility from which sources of radiation may be stored or used and from which equipment is dispatched.

Rule.04(3)(m)

(m) "Guide tube" means a flexible or rigid tube, or "J" tube, for guiding the

source assembly and the attached control cable from the exposure device to the exposure head. The guide tube may also include the connections necessary for attachment to the exposure device and to the exposure head.

~~(e)~~ ~~"GED" means general education development.~~

(n) "Hands-on experience" means experience in all of those areas considered to be directly involved in the radiography process.

~~(f)~~ ~~"I.D. Card" means the document issued by the Department to individuals who have completed the requirements stated in (10)(c) of this Rule.~~

(o) "Independent certifying organization" means an independent organization that meets all of the criteria of Appendix A of this Rule.

~~(g)~~(p) "Industrial radiography" means the examination of the macroscopic structure of materials by nondestructive methods using sources of ionizing radiation to produce radiographic images.

(q) "Lay-barge radiography" means industrial radiography performed on any water vessel used for laying pipe.

(r) "Offshore platform radiography" means industrial radiography conducted from a platform over a body of water.

~~(h)~~ ~~"Lixiscope" means a portable light intensified imaging device using a sealed source.~~

~~(i)~~(s) "Permanent radiographic installation" means a shielded installation or structure designed or intended for radiography and in which radiography is regularly performed.

~~(j)~~(t) "Personal supervision" means guidance and instruction provided to a radiographer's ~~trainee~~ assistant by a radiographer ~~instructor~~ who is present at the site, in visual contact with the ~~trainee~~ radiographer's assistant while the ~~trainee~~ radiographer's assistant is using ~~sources of radiation~~ radioactive material, and in such proximity that immediate assistance can be given if required.

Rule.04(3)(u)

(u) "Pigtail" see "Source assembly".

(v) "Pill" see "Sealed source".

(w) "Practical examination" means a demonstration through application of the safety rules and principles in industrial radiography including use of all procedures and equipment to be used by radiographic personnel.

~~(p)~~(x) "Radiation Safety Officer" means an individual named by the licensee who has a knowledge of, responsibility for, and authority to impose appropriate radiation protection rules, standards, and practices on behalf of the licensee and who meets the requirements of (15)~~(a)4.~~ of this Rule.

~~(k)~~(y) "Radiographer" means any individual who performs or who, in attendance at the site where radioactive materials are being used, personally supervises industrial radiographic operations and who is responsible to the licensee for assuring compliance with the requirements of this Chapter and all license conditions.

(z) "Radiographer certification" means written approval received from a certifying entity stating that an individual has satisfactorily met the radiation safety, testing, and experience criteria in(16) of this rule.

~~(l) "Radiographer instructor" means any radiographer who has been authorized by the Department to provide instruction to radiographer trainees in accordance with (6)(a) of this Rule.~~

~~(m)~~(aa) ~~"Radiographer trainee" means any individual who, under the personal supervision of an instructor, uses sources of radiation, related handling tools, or radiation survey instruments during the course of his instruction.~~ "Radiographer's assistant" means any individual who under the direct supervision of a radiographer, uses radiographic exposure devices, radioactive materials, related handling tools, or radiation survey instruments in industrial radiography.

~~(n)~~(bb) "Radiographic exposure device" means any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to an unshielded position for purposes of making a radiographic exposure (e.g. camera).

(cc) "Radiographic operations" means all activities performed with a radiographic exposure device. Activities include using, transporting except by common or

Rule.04(3)(cc)

contract carriers, or storing at a temporary job site, performing surveys to confirm the adequacy of boundaries, setting up equipment, and any activity inside restricted area boundaries.

~~(o) "Radiographic personnel" means any radiographer, radiographer instructor, or radiographer trainee.~~

~~(q)~~(dd) "Residential location" means any area where structures in which people live or lodge are located, and the grounds on which such structures are located including, but not limited to, houses, apartments, condominiums, and garages.

(ee) "S-tube" means a tube through which the radioactive source travels when inside a radiographic exposure device.

(ff) "Sealed source" means any radioactive material that is encased in a capsule designed to prevent leakage or escape of the radioactive material.

~~(r)~~(gg) "Shielded position" means the location within the radiographic exposure device or storage container which, by manufacturer's design, is the proper location for storage of the sealed source.

~~(s)~~(hh) "Shielded-room radiography" means industrial radiography conducted in a room shielded so that radiation levels at every location on the exterior meet the limitations specified in Rule 391-3-17-.03(5)(i) of this Chapter.

(ii) "Source assembly" means an assembly that consists of the sealed source and a connector that attaches the source to the control cable. The source assembly may include a ball stop to secure the source in the shielded position.

~~(t)~~(jj) "Source changer" means a device designed and used for replacement of sealed sources in radiographic exposure devices, including those source changers also used for transporting and storage of sealed sources.

~~(u)~~(kk) "Storage area" means any location, facility, or vehicle which is used to store, to transport, or to secure a radiographic exposure device, a storage container, or a sealed source when it is not in use and which is locked or has a physical barrier to prevent accidental exposure, tampering with, or unauthorized removal of the device, container, or source.

Rule.04(3)(ll)

~~(v)~~(ll) "Storage container" means a shielded device in which sealed sources are secured and stored.

~~(w)~~(mm) "Temporary job site" means any location where ~~industrial~~ radiography~~ic~~ operations are ~~is~~ performed and where sources of radiation may be stored ~~for a period not in excess of 90 days in any calendar year and at a location~~ other than the location(s) listed specifically on the license.

~~If use of sources of radiation is authorized at a temporary job site, storage incident to that use is also authorized. This does not include shielded room radiography or permanent radiographic installations.~~

~~(x)~~(nn) "Transport container" means a package that is designed to provide radiation safety and security when sealed sources are transported and meets all applicable requirements of the U.S. Department of Transportation.

(oo) "Underwater radiography" means radiographic operations performed when the radiographic exposure device or radiation machine and/or related equipment are beneath the surface of the water.

~~(3)~~(4) Licensing Requirements for Industrial Radiography Operations. ~~Use of Sealed Sources in Industrial Radiography. In addition to the requirements set forth in Rule 391-3-17-.02(8), a specific license for use of sealed sources in industrial radiography will be issued only if:~~ The Department will approve an application for a specific license for the use of licensed material if the applicant meets the following requirements:

(a) The applicant satisfies the general requirements specified in Rule 391-3-17-.02(8), as applicable, and any special requirements contained in this Rule;

~~(a)~~(b) ~~The applicant will have an adequate program for training radiographers and radiographer trainees and submits to the Department a schedule and description of such program which specifies the:~~

~~1. Initial training;~~

~~2. Periodic training;~~

~~3. On-the-job training;~~

~~4. Method to be used by the licensee to determine the radiographer's knowledge and understanding of, and ability to comply with, Department Regulations and licensing requirements, and the operating and emergency procedures of the applicant; and~~

Rule.04(4)(b)

~~5.~~ ~~Method to be used by the licensee to determine the radiographer trainee's knowledge and understanding of, and ability to comply with, the operating and emergency procedures of the applicant;~~ The applicant submits an adequate program for training radiographers and radiographer's assistants that meets the requirements of .04(16):

1. After [2 years after the final rule is published], the applicant need not describe the initial training and examination program for radiographers in the subjects outlined in .04(16)(g).

2. ~~From [insert effective date of final rule] to [2 years after the final rule is published]~~, The applicant may affirm that all individuals acting as industrial radiographers will be certified in radiation safety by a certifying entity before commencing duty as radiographers. This affirmation substitutes for a description of its initial training and examination program for radiographers in the subjects outlined in .04(16)(g).

(c) The applicant submits procedures for verifying and documenting the certification status of radiographers and for ensuring that the certification of individuals acting as radiographers remains valid;

~~(b)~~(d) ~~The applicant has established and submits to the Department satisfactory written operating and emergency procedures as described in (6)(b) of this Rule.~~ The applicant submits written operating and emergency procedures as described in .04(17);

~~(c)~~(e) ~~The applicant has established and submits a description of an in-house inspection program adequate to insure that Department Regulations and license provisions, and the applicant's operating and emergency procedures are followed by radiographers and radiographer trainees. The inspection program must:~~ The applicant submits a description of a program for inspections of the job performance of each radiographer and radiographer's assistant at intervals not to exceed six months as described in .04(16)(e);

~~1.~~ ~~Include observing and recording the performance of each radiographer and radiographer trainee during an actual radiographic operation at intervals not to exceed three months.~~

~~2.~~ ~~Provided that, if a radiographer or a radiographer trainee has not participated in a radiographic operation for more than three months since the last inspection, that individual's performance must be observed and recorded the next time the individual participates in a radiographic operation; and~~

Rule.04(4)(f)

~~3. Include retention of inspection records on performance of radiographers and radiographer trainees for two years.~~

~~(d)~~(f) The applicant submits a description of ~~his~~ the applicant's overall organizational structure ~~pertaining to the industrial radiography program,~~ as it applies to the radiation safety responsibilities in industrial radiography, including specified delegations of authority and responsibility ~~for operation of the program~~;

(g) The applicant submits the qualifications of the individual(s) designated as the radiation safety officer as described in .04(15)(a);

~~(e)~~(h) ~~The applicant who desires to conduct his own leak tests has established adequate procedures to be followed in leak testing sealed sources for possible leakage and contamination and submits to the Department a description of such procedures including:~~ If an applicant intends to perform leak testing of sealed sources or exposure devices containing depleted uranium (DU) shielding, the applicant must describe the procedures for performing the test. The description must include the:

1. ~~Instrumentation to be used;~~ Methods of collecting the samples;

2. ~~Methods of performing tests, e.g., points on equipment to be smeared and method of taking smear; and~~ Instruments to be used;

3. Methods of analyzing the samples; and

3.4. ~~Pertinent experience of the person who will perform the tests;~~ Qualifications of the individual who analyzes the samples.

~~(f) The licensee shall conduct a program for inspection and maintenance of radiographic exposure devices and storage containers to assure proper functioning of components important to safety.~~

(i) If the applicant intends to perform calibrations of survey instruments and alarming ratemeters, the applicant must describe methods to be used and the experience of the person(s) who will perform the calibrations. All calibrations must be performed according to the procedures described and at the intervals prescribed in .04(8)(b) and .04(19)(g)4.;

(j) The applicant identifies and describes the location(s) of all field stations and permanent radiographic installations;

(k) The applicant identifies the location(s) where all records required by this and other Rules in this Chapter will be maintained;

Rule.04(4)(l)

(l) If a license application includes underwater radiography the applicant must submit a description of:

1. Radiation safety procedures and radiographer responsibilities unique to the performance of underwater radiography;

2. Radiographic equipment and radiation safety equipment unique to underwater radiography; and

3. Methods for gas-tight encapsulation of equipment; and

(m) If an application includes offshore platform and/or lay-barge radiography the applicant must submit a description of:

1.Transport procedures for radioactive material to be used in industrial radiographic operations;

2. Storage facilities for radioactive material; and

3. Methods for restricting access to radiation areas.

~~(4)~~(5) Performance Requirements for Radiography Equipment. Equipment used in industrial radiographic operations must meet the following minimum criteria:

(a) Each radiographic exposure device, source assembly or sealed source and all associated equipment must meet the requirements specified in American National Standards Institute (ANSI) N432-1980 "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography," (published as NBS Handbook 136, issued January 1981). (This publication may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402 and from the American National Standards Institute, Inc., 15 42nd Street, 11 West ~~1430 Broadway~~, New York, New York, ~~10018~~ 10036, Telephone (212) 642-4900. Copies of the document are available for inspection at the Department of Natural Resources, Radioactive Materials Program, 4244 International Parkway, Suite 114, Atlanta, Georgia ~~33054~~ 30354 or current address.)

~~Engineering analyses may be submitted by an applicant or licensee to demonstrate the applicability of previously performed testing on similar individual radiography equipment components. Upon review, the Department may find this an acceptable alternative to actual testing of the~~

~~component pursuant to the referenced standard.~~

(b) In addition to the requirements specified in (45)(a) of this Rule, the following

Rule.04(5)(b)

requirements apply to radiographic exposure devices, source changers, source assemblies or sealed sources ~~and associated equipment~~:

1. Each radiographic exposure device must have attached to it by the user, a durable, legible, clearly visible label bearing the:

   (i) Chemical symbol and mass number of the radionuclide in the device;

   (ii) Activity and the date on which this activity was last measured;

   (iii) Model number (or product code) and serial number of the sealed source;

   (iv) Manufacturer of the sealed source; and

   (v) Licensee's name, address, and telephone number.

2. Radiographic exposure devices intended for use as Type B transport containers must meet the applicable requirements of 10 CFR Part 71.

3. Modification of any radiographic exposure devices, source changers, source assemblies and associated equipment is prohibited, unless the design of any replacement component, including source holder, source assembly, controls or guide tubes would not compromise the
design safety features of the system.

(c) In addition to the requirements specified in .04(45)(a) and (45)(b) ~~of this Rule~~, the following requirements apply to radiographic exposure devices, source assemblies and associated equipment that allow the source to be moved out of the device for routine operation:

1. The coupling between the source assembly and the control cable must be designed in such a manner that the source assembly will not become disconnected if cranked outside the guide tube. The coupling must be such that it cannot be unintentionally

disconnected under normal and reasonably foreseeable abnormal conditions.

2. The device must automatically secure the source assembly when it is cranked back into the fully shielded position within the device. This securing system may only be released by means of a deliberate operation on the exposure device.

3. The outlet fittings, lock box, and drive cable fittings on each
Rule.04(5)(c)3.

radiographic exposure device must be equipped with safety plugs or covers which must be installed during storage and transportation to protect the source assembly from water, mud, sand or other foreign matter.

4. Each sealed source or source assembly must have attached to it or engraved in it, a durable, legible, visible label with the words: "DANGER - RADIOACTIVE." The label must not interfere with the safe operation of the exposure device or associated equipment.

5. The guide tube must be able to withstand a ~~have passed the~~ crushing tests that closely approximates the crushing forces that are likely to be encountered during use, and be able to withstand ~~for the control tube as specified in ANSI N432 and~~ a kinking resistance test that closely approximates the kinking forces likely to be encountered during use.

6. Guide tubes must be used when moving the source out of the device.

7. An exposure head or similar device designed to prevent the source assembly from passing out of the end of the guide tube must be attached to the outermost end of the guide tube during radiographic operations.

8. The guide tube exposure head connection must be able to withstand the tensile test for control units specified in ANSI N432-1980.

9. Source changers must provide a system for ~~a~~sensuring that the source will not be accidently withdrawn from the changer when connecting or disconnecting the drive cable to or from a source assembly.

~~(d) All newly manufactured radiographic exposure devices and associated equipment acquired by licensees after January 10, 1992 must comply with the requirements of this section.~~

(d)~~(e)~~ All radiographic exposure devices and associated equipment in use after January 10, 1996 must comply with the requirements of ~~this section~~ .04(5).

(e)~~(f)~~ Notwithstanding (45)(a)~~, (d), and (e),~~ equipment used in industrial radiographic operations need not comply with section 8.9.2(c) of the Endurance Test in ANSI N432-1980 if the prototype equipment has been tested using a torque value representative of the torque that an individual using the radiography equipment can realistically exert on the lever or crankshaft of the drive mechanism.

Rule.04(6)

~~(5)~~(6) Equipment Control. Limits on External Radiation Levels From Storage Containers and Source Changers. The maximum exposure rate limits for storage containers and source changers are 2 millisieverts (200 mrem) per hour at any exterior surface, and 0.1 millisieverts (10 mrem) per hour at one meter from any exterior surface with the sealed source in the shielded position. ~~Limits on Levels of Radiation for Radiographic Exposure Devices and Storage Containers.~~

~~1. Radiographic exposure devices measuring less than four inches from the sealed source storage position to any exterior surface of the device shall have no radiation level in excess of 50 milliroentgens per hour at six inches from any exterior surface of the device. Radiographic exposure devices measuring a minimum of four inches from the sealed source storage position to any exterior surface of the device and all storage containers for sealed sources or outer containers for radiographic exposure devices shall have no radiation level in excess of 200 milliroentgens per hour at any exterior surface and no radiation level in excess of 10 milliroentgens per hour at one meter from any exterior surface. The radiation levels specified are with the sealed source in the shielded (i.e., "OFF") position.~~

~~2. (5)(a)1. applies to all equipment manufactured prior to January 10,1992. After January 10, 1996, radiographic equipment other than storage containers and source changers must meet the requirements of .04(4), and .04(5)(a) applies only to storage containers (source changers).~~

(7)~~(b)~~ Locking and Storage of Radiographic Devices, Storage Containers, and Source Changers.

(a)~~1.~~ Each radiographic exposure device shall be provided with a lock or outer locked container designed to prevent unauthorized or accidental ~~production of radiation or~~ removal ~~or exposure~~ of a sealed source from its shielded position. The exposure device and/or its container~~, and~~ shall be kept locked[1] at all times except when not under the direct surveillance of ~~radiographic personnel~~ a radiograper or a radiographer's assistant except at a permanent radiographic installations as stated in .04(21)~~, or personnel who may be otherwise authorized pursuant to (6)(a) of this Rule.~~

(b) Each sealed source storage container and source changer ~~likewise~~ shall be provided with a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. Storage containers and source changers must be and kept locked when containing

Rule .04(7)(b)

sealed sources except when the container is under the direct surveillance of a ~~radiographic personnel~~ radiographer of radiographer's assistant.

(c)~~2.~~ Radiographic exposure devices, source changers, and storage containers, prior to being moved from one location to another and also prior to being secured at a given location, shall be locked and surveyed to assure that the sealed source is in the shielded position.

(d)~~3.~~ During radiographic operations the sealed source shall be secured in its shielded position by locking the exposure device or securing the remote control each time the sealed source is returned to its shielded position. A survey shall be performed to determine that the sealed source is in the shielded position.

~~(c)~~(e) Storage Precautions.

1. Locked radiographic exposure devices and storage containers shall be physically secured to prevent tampering or removal by unauthorized personnel.

2. Radiographic exposure devices, source changers, or transport containers that contain radioactive material may not be stored in residential locations. This Rule does not apply to storage of

[1]If a keyed lock, the key must be removed at all times.

radioactive material in a vehicle in transit for use at temporary job sites, if the licensee complies with (~~57~~)(~~ee~~)3. of this Rule and if the vehicle does not constitute a permanent storage location as described in (~~57~~)(~~ee~~)4. of this Rule.

3. If a vehicle is to be used for storage of radioactive material, a vehicle survey shall be performed after securing the radioactive material in the vehicle and before transport to ensure that radiation levels do not exceed the limits specified in Rule .03(5)(i) of this Chapter at the exterior surface of the vehicle.

(i) If this vehicle is parked in a residential location a 360° survey of the vehicle must be performed before leaving the vehicle unattended to ensure that radiation levels do not exceed the limits specified in Rule .03(5)(i) of this Chapter.

(ii) An unattended vehicle shall have the name, local address, and local telephone number of the person responsible for the vehicle, posted on it in a conspicuous place on the vehicle.

4. A storage or use location is considered permanent if radioactive material is stored at the location for more than 90 days and any one

Rule.04(7)(e)4.

or more of the following applies to the location:

(i) Telephone service is established by the licensee;

(ii) Industrial radiographic services are advertised for or from the location;

(iii) Industrial radiographic operations are conducted at other sites due to arrangements made from the location.

(8)(~~d~~) Radiation Survey Instruments.

(a)~~1.~~ The licensee shall maintain sufficient calibrated and operable radiation survey instruments to make physical radiation surveys as required by this Rule and Rule 391-3-17-.03(7)(a)1 and 2. Instrumentation required herein shall have a range such that ~~2~~ two milliroentgens per hour through one Roentgen per hour can be measured.

(b)~~2.~~ The licensee shall have each radiation survey instrument required under .04(4)(d) ~~shall be~~ calibrated:

1. ~~(i)~~ By a person licensed or certified by the Department, another Agreement State, or the U.S. Nuclear Regulatory Commission to perform such service;

2. ~~(ii)~~ At energies appropriate for the licensee's use;

3. ~~(iii)~~ At intervals not to exceed ~~three~~ six months and after each instrument servicing, except for battery changes;

4. ~~(iv)~~ To demonstrate an accuracy within ±20 percent ; and

5. ~~(v)~~ At two points located approximately 1/3 and 2/3 of full-scale on each scale for linear scale instruments; at midrange of each decade, and at two points of at least one decade for logarithmic scale instruments; and at approximate points for digital instruments.

(c)~~3.~~ The licensee ~~Records~~ shall ~~be~~ maintained records of these results of the instrument calibrations ~~for two years after the calibration date for inspection by the Department.~~ in accordance with .04(25)

~~4. Each radiation survey instrument shall be checked with a radiation source at the beginning of each day of use and at the beginning of each work shift to ensure the survey instrument is operating properly.~~

Rule.04(9)

(9)~~(e)~~ Leak Testing~~, Repair, Tagging, Opening, Modification,~~ and Replacement of Sealed Sources.

(a)~~1.~~ The replacement of any sealed source fastened to or contained in a radiographic exposure device and leak testing~~, repair, tagging, opening, or any other modification~~ of any sealed source shall be performed only by persons specially authorized to do so by the Department, the Nuclear Regulatory Commission, or an Agreement State.

(b) The opening, repair, or modification of any sealed source shall be performed only by persons specially authorized to do so by the Department, the Nuclear Regulatory Commission, or an Agreement State.

(c)~~2.~~ Testing and Record keeping Requirements

1. Each licensee who uses a sealed source shall have the source ~~be~~ tested for leakage at intervals not to exceed six months. The leak testing of the source must be performed using a method approved

by the Department, the Nuclear Regulatory Commission, or by another Agreement State. The wipe sample should be taken from the nearest accessible point to the sealed source where contamination might accumulate. The wipe sample must be analyzed for radioactive contamination. The analysis must be capable of detecting the presence of 0.005 microcuries (185 bequerel) of radioactive material on the test sample and must be performed by a person specifically authorized by the Department, the Nuclear Regulatory Commission, or another Agreement State to perform the analysis.

2. The licensee shall maintain records of the leak test in accordance with .04(26)

3. Unless a sealed source is accompanied by ~~In the absence of~~ a certificate from a transferor that shows ~~indicating~~ that it has been leak ~~a~~ tested ~~has been made~~ within the six months before ~~prior to~~ the transfer, it ~~the sealed source~~ shall not be ~~put into~~ used by the licensee until tested for leakage. Sealed sources authorized for storage and not in use do not require leak testing, but must be tested before use or transfer to another person if the interval of storage exceeds six months.

~~3.~~ ~~The leak test shall be capable of detecting the presence of 0.005~~ Rule .04(9)(c)4.

~~microcuries (185 Bq) of removable contamination on the sealed source. An acceptable leak test for sealed sources in the possession of a radiography licensee would be to test at the nearest accessible point to the sealed source storage position, or other appropriate measuring point, by a procedure to be approved pursuant to (3)(e) of this Rule. Records of leak test results shall be kept in units of microcuries (becquerels) and maintained for six months after the next required leak test is performed or until the sealed source is transferred or disposed~~.

4. Any test conducted pursuant to the requirements of (~~5~~9)(ec)~~2~~1. and 3. of this Rule which reveals the presence of 0.005 microcuries (185 ~~Bq~~ bequerel) or more of removable radioactive material shall be considered evidence that the sealed source is leaking. The licensee shall immediately withdraw the equipment involved from use and shall cause it to be decontaminated and repaired or ~~to be~~ disposed of in accordance with Department Rules. ~~Two copies of~~ A report shall be filed, within five ~~(5)~~ days after obtaining results of the test, with the Department, describing the equipment involved, the test results, and the corrective action taken.

~~5. Any sealed source which is not fastened to or contained in a radiographic exposure device shall have permanently attached to it a durable tag at least one inch square bearing the radiation symbol as prescribed in Rule 391-3-17-.03(11)(a) and at least the following instructions: "DANGER--RADIOACTIVE MATERIAL--DO NOT HANDLE--NOTIFY CIVIL AUTHORITIES IF FOUND".~~

~~6.~~5. ~~Depleted uranium that will not meet the requirements of a safe locking device shall be treated as a sealed source and will be maintained as is prescribed in this Chapter.~~ Each exposure device using depleted uranium (DU) shielding and an "S" tube configuration must be tested for DU contamination at intervals not to exceed 12 months. The analysis must be capable of detecting the presence of 0.005 µCi (185 becquerel) of radioactive material on the test sample and must be performed by a person specifically authorized by the Department, the Nuclear Regulatory Commission, or another Agreement State to perform the analysis. Should such testing reveal the presence of DU contamination, the exposure device must be removed from use until an evaluation of the wear of the S-tube has been made. Should the evaluation reveal that the S-tube is worn through, the device may not be used again. DU shielded devices do not have to be

Rule.04(9)(c)5.

tested for DU contamination while not in use and in storage. Before using or transferring such a device, however, the device must be tested for DU contamination, if the interval of storage exceeds 12 months. A record of the DU leak-test must be made in accordance with .04(26)

(10)~~(f)~~ Quarterly Inventory.

(a) Each licensee shall conduct a quarterly physical inventory to account for all sealed sources and ~~radiographic exposure~~ devices ~~(to include~~ containing depleted uranium~~)~~ received or possessed ~~by him~~ under the license.

(b) The licensee shall maintain records of the quarterly inventories in accordance with .04(27) ~~shall be maintained for 2 years from the date of the inventory for inspection by the Department and shall include the quantities and kinds of radioactive material, the location of sealed sources, the date of the inventory, the name of the individual making the inventory, the manufacturer, the model number, and the serial number.~~

~~(g) Utilization Logs. Each licensee shall maintain current logs, which shall be kept available for inspection by the Department, for two years from the date of the recorded event, showing for each sealed source the following information:~~

~~1. A unique identification, such as a serial number, for each radiographic exposure device in which a sealed source is located, and for each sealed source;~~

~~2. The identity of the radiographer to whom assigned;~~

~~3. Locations where used and dates of use; and~~

~~4. The date(s) each source of radiation is removed from storage and returned to storage.~~

~~(h) Inspection and Maintenance of Radiographic Exposure Devices, Storage Containers, and Source Changers.~~

~~1. The licensee shall check for obvious defects in radiographic exposure devices, storage containers, and source changers prior to use each day.~~

~~2. The licensee shall conduct a program of at least quarterly inspection~~

Rule.04(11)

~~and maintenance of radiographic exposure devices, storage containers, and source changers prior to their first use thereafter to assure proper functioning of components important to safety. All appropriate parts shall be maintained in accordance with the manufacturer's specifications. Records of inspection and maintenance shall be maintained for two years from the date of the recorded event.~~

~~3. If any inspection conducted pursuant to (5)(h)1. or (5)(h)2. of this Rule reveals damage to components critical to radiation safety, the device shall be removed from service and labeled as defective until repairs have been made.~~

(11) Inspection and Maintenance of Radiographic Exposure Devices, Transport and Storage Containers, Associated Equipment, Source Changers, and Survey Instruments.

(a) The licensee shall perform visual and operability checks on survey meters radiographic exposure devices, transport and storage containers, associated equipment and source changers before each day's use, or work shift, to ensure that:

1. The equipment is in good working condition;

2. The sources are adequately shielded; and

3. Required labeling is present.

(b) Survey instrument operability must be performed using check sources or other appropriate means.

(c) If equipment problems are found, the equipment must be removed from service until repaired.

(d) Each licensee shall have written procedures for and perform inspection and routine maintenance of radiographic exposure devices, source changers, associated equipment, transport and storage containers, and survey instruments at intervals not to exceed three months or before the first use thereafter to ensure the proper functioning of components important to safety. If equipment problems are found, the equipment must be removed from service until repaired.

(e) The licensee's inspection and maintenance program must include Rule.04(11)(e)

procedures to assure that Type B packages are shipped and maintained in
accordance with the certificate of compliance or other approval.

(f) Records of equipment problems and of any maintenance performed under .04(11)(c) and (d) shall be maintained in accordance with .04(29)

(12)~~(i)~~ Permanent Radiographic Installations.

~~Permanent radiographic installations shall have high radiation area entrance controls of the types described in Rule 391-3-17-.03(8)(a)1.(ii), (iii), or .03(8)(a)2 and shall also meet the following requirements:~~

(a)~~1.~~ Each entrance that is used for personnel access to the high radiation area in a permanent radiographic installation shall have either:

1. An entrance control of the types described in Rule 391-3-17-

.03(9)(a)1., or .03(9)(a)2 that causes the radiation level upon entry into the area to be reduced: or

2. Both visible and audible warning signals to warn of the presence of radiation. The visible signal shall be activated by radiation whenever the source is exposed. The audible signal shall be actuated when an attempt is made to enter the installation while the source is exposed.~~; and~~

(b)~~2.~~ The ~~control device or~~ alarm system shall be tested for proper operation with a radiation source ~~at the beginning of~~ each day before the installation is used for radiographic operations ~~of equipment use~~. The test must include a check of both the visible and audible signals. Entrance control devices that reduce the radiation level upon entry as designated in .04(12)(a) must be tested monthly. If an entrance control device or alarm system is operating improperly, it shall be immediately labeled as defective and repaired within seven calendar days. ~~before industrial radiographic operations are resumed.~~ The facility may continue to be used during this seven day period, provided the licensee implements the continuous surveillance requirements of .04(21) and uses an alarming ratemeter. ~~Records of such tests and repairs shall be maintained for inspection by the Department for two years from the date of the event.~~ Test records for entrance controls and audible and visual alarms and records of repairs must be maintained in accordance with .04(30).

(13) Labeling, Storage, and Transportation.

Rule.04(13)(a)

(a) The licensee may not use a source changer or a container to store radioactive material unless the source changer or the storage container has securely attached to it a durable, legible, and clearly visible label bearing the standard trefoil radiation caution symbol conventional colors, i.e., magenta, purple or black on a yellow background, having a minimum diameter of 25 mm, and the wording:

CAUTION *
RADIOACTIVE MATERIAL
NOTIFY CIVIL AUTHORITIES [or " NAME OF COMPANY"]

* --- or "DANGER"

(b) The licensee may not transport radioactive material unless the material is packaged, and the package is labeled, marked, and accompanied with appropriate shipping papers in accordance with regulations set out in Rule 391-3-17-.06.

(c) Radiographic exposure devices, source changers, and storage containers, must be physically secured to prevent tampering or removal by unauthorized personnel. The licensee shall store radioactive material in a manner that will minimize danger from explosion or fire.

(d) The licensee shall lock and physically secure the transport package containing radioactive material in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal.

(e) The licensee's name and city or town where the main business office is located shall be prominently displayed with a durable, clearly visible label(s) on both sides of all vehicles used to transport radioactive material for temporary job site use.

(14)~~(7)~~ ~~Precautionary Procedures in~~ Conducting Industrial Radiographic Operations.

(a) ~~Security. During each radiographic operation the radiographic personnel shall maintain a direct surveillance of the operation to protect against unauthorized entry into a radiation or high radiation area as defined in Rule 391-3-17-.01(2) except:~~ Whenever radiography is performed at a location other than a permanent radiographic installation, the radiographer must be accompanied by at least one other qualified radiographer or an individual who has at a minimum met the requirements of .04(16)(c). The additional qualified individual

Rule.04(14)(b)

shall observe the operations and be capable of providing immediate assistance to prevent unauthorized entry. Radiography may not be performed if only one qualified individual is present.

(b)~~1.~~ ~~Where the high radiation area is equipped with a control device or an alarm system as described in Rule .03(8)(a)1., 2., or 3. of this Chapter; or~~ All radiographic operations conducted at locations of use authorized on the license must be conducted in a permanent radiographic installation, unless otherwise specifically authorized by the Department.

(c)~~2.~~ ~~Where the high radiation area is locked to protect against unauthorized or accidental entry; and~~ Except when physically impossible, collimators shall be used in industrial radiographic operations that use radiographic exposure devices that allow the source to be moved out of the device.

(d)~~3.~~ ~~Radiographic exposure devices shall not be left unattended except when in storage or physically secured against unauthorized removal or~~

~~tampering.~~ A licensee may conduct lay-barge, offshore platform, or underwater radiography only if procedures have been approved by the Department.

(15) ~~4.~~ Radiation Safety Officer. A Radiation Safety Officer (RSO) shall be designated on every industrial radiography license issued by the Department. The Radiation Safety Officer shall ensure that radiation safety activities are being performed in accordance with approved procedures and regulatory requirements in the daily operation of the licensee's program.

(a)~~(i)~~ ~~The RSO's qualifications shall be submitted to the Department and shall include~~ The minimum qualifications, training, and experience for radiation safety officers for industrial radiography are as follows:

1.~~(I)~~ ~~Possession of a high school diploma or a certificate of high school equivalency based on the GED test~~ Completion of the training and testing requirements of .04(16);

2.~~(II)~~ ~~Completion of the training and testing requirements of (6)(a)2. of this Rule;~~ 2000 hours of hands-on experience as a qualified radiographer in industrial radiographic operations; and

3.(III) ~~Two years of documented radiation protection experience, including knowledge of industrial radiographic operations with at least 40 hours of active participation in industrial radiographic operations~~ Formal training in the establishment and maintenance of a radiation protection

Rule.04(15)(a)3.

program.

(b) The Department will consider alternatives when the radiation safety officer has appropriate training and experience in the field of ionizing radiation, and in addition, has adequate formal training with respect to the establishment and maintenance of a radiation safety protection program.

(c)~~(ii)~~ The specified duties of the RSO include, but are not limited to, the following:

1.~~(I)~~ ~~To~~ Establishing and overseeing all operating, emergency, and ALARA procedures, and to review them regularly to ensure that the procedures are current and conform with these Rules;

2.~~(II)~~ ~~To~~ Overseeing and approveing all phases of the training program for radiographic personnel so that appropriate and effective radiation protection practices are taught;

3.~~(III)~~ ~~To~~ Ensureing that required radiation surveys and leak tests are performed and documented in accordance with these Rules, including any corrective measures when levels of radiation exceed established limits;

4.~~(IV)~~ ~~To~~ Ensureing that personnel monitoring devices are calibrated and used properly by occupationally-exposed personnel, that records are kept of the monitoring results, and that timely notifications are made as required by this Chapter;

5.~~(V)~~ To Ensureing that any required interlock switches and warning signals are functioning and that radiation signs, ropes, and barriers are properly posted and positioned;

6.~~(VI)~~ ~~To~~ Investigateing and reporting to the Department each known or suspected case of radiation exposure to an individual, or radiation level detected, in excess of limits established by this Chapter and each theft or loss of source(s) of radiation, to determine the cause and to take steps to prevent its recurrence;

7.~~(VII)~~ ~~To~~ Haveing a thorough knowledge of management policies and administrative procedures of the licensee;

8.~~(VIII)~~ ~~To~~ Assumeing control and haveing the authority to institute corrective actions including shutdown of operations when necessary in emergency

Rule.04(15)(c)8.

situations or unsafe conditions;

9.~~(IX)~~ ~~To~~ Maintaining records as required by this Chapter;

10.~~(X)~~ ~~To~~ Ensureing the proper storing, labeling, transport, and use of exposure devices and sources of radiation;

11.~~(XI)~~ ~~To~~ Ensureing that inventory and inspection and maintenance programs are performed in accordance with ~~(5)~~ (10) and (11)of this Rule;

12.~~(XII)~~ ~~To~~ Ensureing that personnel are complying with this Chapter, the conditions of the license, and the operating and emergency procedures of the licensee.

~~5. Records of the above training, including copies of written tests and field~~

~~examinations, shall be maintained for three years.~~

(16)~~(6)~~ ~~Personal Radiation Safety Requirements for Radiographers and Radiographer Trainees.~~ Training

(a) ~~Training and Testing.~~

~~1. The licensee shall not permit any individual to act as a radiographer trainee until such individual:~~

~~(i) Has been instructed in the subjects outlined in (9) of this Rule;~~

~~(ii) Has received copies of and instructions in Department Regulations contained in this part and in the applicable requirements of Rule 391-3-17-.03, Rule 391-3-17-.07, in the license(s) under which radiography is performed, and in the licensee's operating and emergency procedures;~~

~~2.~~ The licensee shall not permit any individual to act as a radiographer until such individual~~:~~
~~(i)~~has received at least 40 hours of training in the subjects outlined in .04(16)g., in addition to on the job training consisting of hands-on experience under the supervision of a radiographer and is certified through a radiographer certification program by a certifying entity in accordance with the criteria specified in Appendix A of this Rule. The on the job training shall include a minimum of 2 months (320 hours) of active participation in the performance of industrial radiography utilizing radioactive material. ~~Has been instructed in the~~
Rule.04(16)(b)

~~subjects outlined in (9) of this Rule;~~

~~(ii) Has provided the Department with documentation showing completion of at least 30 days of on-the-job training by a radiographer instructor as a radiographer trainee following completion of the requirements of (6)(a)1;~~

~~(iv) Has demonstrated competence to use the licensee's radiographic exposure devices, sealed sources, related handling tools, and radiation survey instruments;~~

~~(v) Has demonstrated an understanding of the instructions in(6)(a)2. of this Rule by successful completion of a written test and a field examination on the subjects covered; and~~

~~(vi) Possesses a current certified radiographer ID card issued by~~

~~the State of Georgia, an agreement state, American Society of Non Destructive Testing or the United States Nuclear Regulatory Commission.~~

(b) ~~3.~~ ~~The licensee shall not permit any individual to act as a radiographer instructor until it has been documented to the Department that such individual:~~

~~(I) Has met the requirements of (6)(a)2. of this Rule;~~

~~(ii) Has one year of documented experience as an individual radiographer; and~~

~~(iii) Is named on the specific license issued by the Department, an agreement state, or the United States Nuclear Regulatory Commission and under which the individual is acting as a radiographer instructor.~~ In addition, the licensee may not permit any individual to act as a radiographer until the individual:

1. Has received copies of and instruction in the requirements described in the regulations contained in this Rule, and applicable sections of Rules 391-1-7-.03, .06, and .07, in the license under which the radiographer will perform industrial radiography, and the licensee's operating and emergency procedures;

2. Has demonstrated an understanding of items in .04(16)(b)1. by Rule.04(16)(b)2.

successful completion of a written or oral examination;

3. Has received training in the use of the licensee's radiographic exposure devices, sealed sources, in the daily inspection of devices and associated equipment, and in the use of radiation survey instruments; and

4. Has demonstrated understanding of the use of the equipment described in .04(16)(b)3. by successful completion of a practical examination.

(c) The licensee may not permit any individual to act as a radiographer's assistant until the individual:

1. Has received copies of and instruction in the requirements described in these regulations contained in this Rule, and

applicable sections of Rules 391-3-17-03, .06 , and .07, in the license under which the radiographer's assistant will perform industrial radiography, and the licensee's operating and emergency procedures;

2. Has demonstrated an understanding of items in .04(16)(c)1. by successful completion of a written or oral examination;

3. Under the personal supervision of a radiographer, has received training in the use of the licensee's radiographic exposure devices and sealed sources, in the daily inspection of devices and associated equipment, and in the use of radiation survey instruments; and

4. Has demonstrated understanding of the use of the equipment described in .04(16)(c)3. by successful completion of a practical examination.

(d) The licensee shall provide annual refresher safety training for each radiographer and radiographer's assistant at intervals not to exceed 12 months.

(e) Except as provided in .04(16)(e)4., the radiation safety officer or designee shall conduct an inspection program of the job performance of each radiographer and radiographer's assistant to ensure that the Department's regulations, the license, and operating and emergency procedures are followed. The inspection program must:

1. Include observation of the performance of each radiographer and radiographer's assistant during an actual industrial radiographic

Rule.04(16)(e)1.

operation, at intervals not to exceed six months; and

2. Provide that, if a radiographer or a radiographer's assistant has not participated in an industrial radiographic operation for more than 6 months since the last inspection, the radiographer must demonstrate knowledge of the training requirements of .04(16)(b)3. and the radiographer's assistant must demonstrate knowledge of the training requirements of .04(16)(c)3. by a practical examination before these individuals can next participate in a radiographic operation.

3. The Department may consider alternatives in those situations where the individual serves as both radiographer and radiation

safety officer.

4. In those operations where a single individual serves as both radiographer and radiation safety officer, and performs all radiography operations, an inspection program is not required.

(f) The licensee shall maintain records of the above training to include certification documents, written, oral and practical examinations, refresher safety training and inspections of job performance in accordance with .04(31).

(g)~~(9) Minimum Subjects to be Covered in Training Radiographer Trainees.~~

~~Training provided to qualify individuals as radiographer trainees in compliance with (6)(a)1. of this Rule shall be presented on a formal basis. The training shall include the following subjects:~~ The licensee shall include the following subjects required in .04(16)(a):

1.~~(a)~~ Fundamentals of Radiation Safety including:

(i)~~1.~~ Characteristics of gamma and x-radiation.

(ii)~~2.~~ Units of radiation dose (rem or Sievert) and quantity of radioactivity (Curie or becquerel).

(iii)~~3.~~ Significance of radiation dose:

(I)~~(i)~~ Radiation protection standards;

(II)~~(ii)~~ Biological effects of radiation dose; and

(III)~~(iii)~~ Case histories of radiography accidents.

Rule.04(16)(g)1.(iii)(IV)

(iv)~~4.~~ Levels of radiation from sources of radiation.

(v)~~5.~~ Methods of controlling radiation dose:

(I)~~(i)~~ Working time;

(II)~~(ii)~~ Working distances; and

(III)~~(iii)~~ Shielding.

2.~~(b)~~ Radiation Detection Instrumentation including ~~to be Used~~.

(i)~~1.~~ Use of radiation survey instruments:

(I)~~(i)~~ Operation;

(II)~~(ii)~~ Calibration; and

(III)~~(iii)~~ Limitations.

(ii)~~2.~~ Survey techniques.

(iii)~~3.~~ Use of personnel monitoring equipment including but not limited to:

(I)~~(i)~~ Film badges;

(II)~~(ii)~~ Thermoluminescent dosimeters (TLDs);

(III)~~(iii)~~ Pocket dosimeters; and

(IV)~~(iv)~~ Alarm ratemeters.

(V) Optically stimulated luminescent devices.

3.~~(e)~~ Radiographic Equipment to be Used including:

(i)~~1.~~ Remote handling equipment.

(ii)~~2.~~ Operation and control of radiographic exposure ~~devices~~ equipment, remote handling equipment, storage containers, and

Rule.04(16)(g)3.(ii)

sealed sources, including pictures or models of source assemblies (pigtails).

(iii)~~3.~~ Storage control, and disposal of sources of radiation; and transport containers and source changers.

(iv)~~4.~~ Collimators.

4. Inspection and maintenance of equipment.

5.~~(e)~~ The Requirements of Pertinent Federal and State Regulations.

6.~~(d)~~ The Licensee's Written Operating and Emergency Procedures.

7. Case histories of accidents in radiography.

(h) Licensees will have one year from the effective date of this rule to comply with the additional training requirements specified in .04(16)(b)1. and .04(16)(c)1.

~~6. Each licensee shall conduct an internal audit program to ensure that the Department's radioactive material license conditions and the licensee's operating and emergency procedures are followed by each radiographer. These internal audits shall be performed at least quarterly, and each radiographer shall be audited at least annually.~~
~~Records of internal audits shall be maintained for inspection by the Department for two years from the date of the audit.~~

(17)~~(b)~~ Operating and Emergency Procedures.

(a) The operating and emergency procedures of the licensee shall include, as a minimum, instruction in ~~at least~~ the following:

1. Appropriate ~~The~~ handling and use of sources of radiation so ~~to be employed such~~ that no individual is likely to be exposed to radiation doses in excess of the limits established in Rule 391-3-17-.03, "Standards for Protection Against Radiation";

2. Methods and occasions for conducting radiation surveys;

3. Methods for posting and ~~occasions for~~ controlling access to Rule.04(17)(a)3.
radiographic areas;

4. Methods and occasions for locking and securing sealed sources;

5. Personnel monitoring and the use of personnel monitoring equipment, including steps that must be taken immediately by radiography personnel in the event a pocket dosimeter is found to be off-scale;

6. Transportatiоng equipment to field locations, including packing of radiographic exposure devices and storage containers ~~sealed sources~~ in the vehicles, plackarding ~~posting~~ of vehicles when required, and control of the equipment ~~sealed sources~~ during

transportation as described in Rule .06 of this Chapter;

7~~10~~. The inspection, ~~and~~ maintenance and operability checks of radiographic exposure devices, survey instruments, alarming ratemeters, transport containers, and storage~~/source~~ containers.

8. Steps that must be taken immediately by radiography personnel in the event a pocket dosimeter is found to be off-scale or an alarming ratemeter alarms unexpectedly;

9. The procedure(s) for identifying and reporting defects and noncompliance, as required by .04(37);

10~~8~~. The procedure for notifying proper persons in the event of an accident or incident;

11~~7~~. Minimizing exposure of individuals in the event of an accident or incident, including a source disconnect, a transport accident, or loss
of a source of radiation;

12. Source recovery procedure if licensee will perform source recoveries; and

13~~9~~. Maintenance of records.~~; and~~

(b) The licensee shall maintain copies of current operating and emergency procedures in accordance with .04(32) and .04(36).

(18)~~(d)~~ Supervision of Radiographer's ~~Trainee~~ Assistants.

Rule.04(18)(a)

(a)~~1.~~ Whenever a radiographer's assistant ~~trainee~~ uses radiographic exposure devices, associated equipment, or a sealed sources, ~~or related source handling tools,~~ or conducts radiation surveys required by (~~7~~20)(b)and (c)~~2. and 3.~~ of this Rule to determine that the sealed source has returned to the shielded position after an exposure, he shall be under the personal supervision of a radiographer ~~instructor~~. The personal supervision shall include:

1.~~(i)~~ The radiographer's ~~instructor's personal~~ physical presence at the site where the sealed sources are being used;

2.~~(ii)~~ The ability of the radiographer ~~instructor~~ to give immediate

assistance if required; and

3.~~(iii)~~ The radiographer's ~~instructor's watching the trainee's~~ direct observation of the assistant's performance of the operations referred to in .04(18) ~~(6)(d?)1.~~ of this Rule.

(19)~~(c)~~ Personnel Monitoring Control.

~~When performing industrial radiographic operations:~~

(a)~~1.~~ The ~~No~~ licensee shall not permit any individuals to act as a radiographi~~cer~~ or a radiographer's assistant ~~personnel~~ unless, at all times during radiographic operations, each ~~such~~ individual wears, on the trunk of the body, a combination of direct-reading ~~pocket~~ dosimeter, an alarming ratemeter, and ~~either a film badge or a thermoluminescent dosimeter~~ a personal monitoring device. At permanent radiographic installations where other appropriate alarming or warning devices are in routine use the use of an alarming ratemeter is not required.

1. Pocket dosimeters shall have a range from zero to 200 milliroentgens (2 millisieverts) and shall be recharged daily or at the start of each shift. Electronic personal dosimeters may only be used in place of ion-chamber pocket dosimeters.

2. Each ~~film badge or thermoluminescent dosimeter~~ personal monitoring device shall be assigned to and worn by only one individual.

3. ~~Film badges and TLDs~~ Personal monitoring devices must be exchanged at periods not to exceed one month ~~replaced at least monthly~~. After replacement each ~~film badge or TLD~~ personal monitoring device must be returned to the supplier for processe~~d~~ing within 14

Rule.04(19)(a)3.

calendar days of the end of the monitoring period, or as soon as practicable ~~exchange date~~. If circumstances exist which make it impossible to return each ~~film badge or TLD~~ personal monitoring device within 14 calendar days, such circumstances must be documented and available for review by the Department.

(b)~~6.~~ ~~Pocket~~ Direct reading dosimeters such as pocket dosimeters or electronic personal dosimeters shall be read and exposures recorded at ~~least once daily~~ the beginning and end of each shift, and records must be maintained in accordance with .04(33). ~~The licensee shall retain each record of these exposures for three years after the~~

~~record is made. If the dosimeter readings were used to determine external radiation dose (i.e., no TLD or film badge exposure records exist), the records shall be maintained until the Department authorizes disposal.~~

(c)~~7.~~ Pocket dosimeters or electonic personal dosimeters shall be checked at periods not to exceed one year for correct response to radiation, and records must be maintained in accordance with .04(33). Acceptable dosimeters shall read within plus or minus ~~30~~ 20 percent of the true radiation exposure. ~~Records of this check shall be maintained for inspection by the Department for two years from the date of the check.~~

(d)~~8.~~ ~~If an individual's pocket dosimeter is discharged beyond its range, his film badge or TLD shall be immediately sent for processing. The individual shall cease industrial radiographic operation and shall not return to work with radiation sources until a determination has been made of his exposure~~. If an individual's pocket dosimeter is found to be off-scale, or the electronic personal dosimeter reads greater than 200 mrem (2 millisieverts), the personal monitoring device must be sent for processing within 24 hours. In addition, the individual may not resume work associated with the use of sources of radiation until a determination of the individual's radiation exposure has been made. This determination must be made by the radiation safety officer or the radiation safety officer's designee. The results of this determination must be included in the records maintained in accordance with .04(33).

(e)4. If a ~~film badge or TLD~~ personal monitoring device is lost or damaged, the worker shall cease work immediately until a replacement ~~film badge or TLD~~ personal monitoring device is provided and the exposure is calculated for the time period from issuance to loss or damage of the ~~film badge or TLD~~ personal monitoring device. The results of the calculated exposure and the time period for which the personal monitoring device was lost or damaged must be included

Rule.04(19)(e)

in the records maintained in accordance with .04(33).

(f)~~5.~~ Reports received from personal monitoring devices ~~Records of film badge or TLD personnel monitoring~~ shall be retained ~~kept until disposal is authorized by the Department.~~ in accordance with .04(33).

(g)~~9.~~ Each alarm ratemeter must:

1.~~(i)~~ Be checked to ensure that the alarm functions properly ~~(sounds)~~ prior to use at the start of each shift;

2.~~(ii)~~ Emit an alarm signal at a preset dose-rate of 500 mr (~~5~~ five mSv) per hour; with an accuracy of plus or minus 20 percent of the true radiation dose rate.

3.~~(iii)~~ Require special means to change the preset alarm function; and

4.~~(iv)~~ Be calibrated at periods not to exceed one year for correct response to radiation. ~~Acceptable ratemeters must alarm within plus or minus 20 percent of the true radiation dose-rate.~~ The licensee shall maintain records of alarming ratemeter calibrations in accordance with .04(33).

~~10. Reports received from the film badge or TLD processor and daily pocket dosimeter readings shall be kept for inspection until the Department authorizes their disposal.~~

~~11. If a film badge or a TLD or an alarm ratemeter is lost or damaged, the worker shall cease work immediately until a replacement film badge or TLD or alarm ratemeter is provided and the exposure is calculated for the time period from issuance to loss or damage of the film badge or TLD or alarm ratemeter.~~

(20)~~(c)~~ Radiation Surveys ~~and Survey Records~~. The license shall:

(a)~~1.~~ ~~No radiographic operation shall be conducted unless at least one calibrated and operable radiation survey instrument, as described in (5)(d) of this Rule, is available and used at each site where radiographic exposures are made~~. Conduct all surveys with a calibrated and operable radiation survey instrument that meets the requirements of .04(8);

(b)~~2.~~ Conduct a survey of the radiographic exposure device and the guide tube after each exposure when approaching the device or the guide tube. The ~~A~~ survey

Rule.04(20)(b)

~~with a radiation survey instrument~~ shall be made ~~after each radiographic exposure~~ to determine that the sealed source has been returned to its shielded position ~~and a survey shall be made of the storage area as defined in (2)(u) of this Rule whenever a radiographic exposure device is being placed in storage.~~ before exchanging films, repositioning the exposure head, or dismantling equipment. ~~The entire circumference of the radiographic exposure device shall be surveyed. If the radiographic exposure device has a source guide tube, the survey shall also include the guide tube.~~

(c)~~3.~~ ~~A physical radiation survey as specified in (5)(b) of this Rule shall be made to determine that each sealed source is in its shielded position prior to securing the radiographic exposure device, storage container, or source changer in a storage area as defined in (2)(u) of this Rule.~~ Conduct a survey of the radiographic exposure device whenever the source is exchanged and whenever a radiographic exposure device is placed in a storage area as defined in .04(3), to ensure that the sealed source is in its shielded position; and

(d)~~4.~~ ~~Records shall be kept of the surveys required by (7)(c)3. of this Rule, including the measurement of the radiation exposure rate at the source outlet port, with the safety plug installed. Such records shall be maintained for inspection by the Department for two (2) years after completion of the survey. If the survey was used to determine an individual's exposure, however, the records of the survey shall be maintained until the Department authorizes their disposition.~~ Maintain records in accordance with .04(34)

(21) Surveillance. During each radiographic operation, the radiographer shall ensure continuous direct visual surveillance of the operation to protect against unauthorized entry into a radiation area or a high radiation area, as defined in Rule .01 of this Chapter, except at permanent radiographic installations where all entryways are locked and the requirements of .04(12) are met.

(22)~~(b)~~ Posting. Notwithstanding any provisions of Rule 391-3-17-.03(~~11~~12)(c) all areas in which industrial radiography is being performed shall be conspicuously posted as required by Rule 391-3-17-.03(~~11~~12)(b)1. and 2.

(23) Records for Industrial Radiography. Each licensee shall maintain a copy of its license, documents incorporated by reference, and amendments to each of these items until superseded by new documents approved by the Department, or until the Department terminates the license.

Rule.04(24)

(24) Records of Receipt and Transfer of Sources of Radiation.

(a) Each licensee shall maintain records showing the receipts and transfers of sealed sources, devices using DU for shielding, and radiation machines, and retain each record for three years after it is made.

(b) These records must include the date, the name of the individual making the record, radionuclide, number of curies (becquerels) or mass (for DU), and manufacturer, model, and serial number of each source of radiation and/or device, as appropriate.

(25) Records of Radiation Survey Instruments. Each licensee shall maintain records of the calibrations of its radiation survey instruments that are required under .04(8) and retain each record for three years after it is made.

(26) Records of Leak Testing of Sealed Sources and Devices Containing DU. Each licensee shall maintain records of leak test results for sealed sources and for devices containing DU. The results must be stated in units of microcuries (becquerels). The licensee shall retain each record for three years after it is made or until the source in storage is removed.

(27) Records of Quarterly Inventory.

(a) Each licensee shall maintain records of the quarterly inventory of sources of radiation, including devices containing depleted uranium as required by .04(10), and retain each record for three years.

(b) The record must include the date of the inventory, name of the individual conducting the inventory, radionuclide, number of curies (becquerels) or mass (for DU) in each device, location of sources of radiation and/or devices, and manufacturer, model, and serial number of each source of radiation and/or device, as appropriate.

(28) Utilization Logs.

(a) Each licensee shall maintain utilization logs showing for each source of radiation the following information:

1. A description, including the make, model, and serial number the radiographic exposure device, transport, or storage container in which the sealed source is located;

Rule.04(28)(a)2.

2. The identity and signature of the radiographer to whom assigned;

3. The location and dates of use, including the dates removed and returned to storage; and

4. For permanent radiographic installations, the dates each radiographic exposure device is used.

(b) The licensee shall retain the logs required by .04(28)(a) for three years.

(29) Records of Inspection and Maintenance of Radiographic Exposure Devices, Transport and Storage Containers, Associated Equipment, Source Changers,

and Survey Instruments.

(a) Each licensee shall maintain records specified in .04(11) of equipment problems found in daily checks and quarterly inspections of radiation machines, radiographic exposure devices, transport and storage containers, associated equipment, source changers, and survey instruments; and retain each record for three years after it is made.

(b) The record must include the date of check or inspection, name of inspector, equipment involved, any problems found, and what repair and/or maintenance, if any, was performed.

(30) Records of Alarm System and Entrance Control Checks at Permanent Radiographic Installations. Each licensee shall maintain records of alarm system and entrance control device tests required by .04(12) and retain each record for three years after it is made.

(31) Records Of Training and Certification. Each licensee shall maintain the following records for three years:

(a) Records of training of each radiographer and each radiographer's assistant. The record must include radiographer certification documents and verification of certification status, copies of written tests, dates of oral and practical examinations, the names of individuals conducting and receiving the oral and practical examinations, and a list of items tested and the results of the oral and practical examinations; and

(b) Records of annual refresher safety training and semi-annual inspections of job performance for each radiographer and each radiographer's assistant. The

Rule.04(31(b)

records must list the topics discussed during the refresher safety training, the dates the annual refresher safety training was conducted, and names of the instructors and attendees. For inspections of job performance, the records must also include a list showing the items checked and any non-compliance observed by the radiation safety officer or designee.

(32) Copies of Operating and Emergency Procedures. Each licensee shall maintain a copy of current operating and emergency procedures until the Department terminates the license. Superseded material must be retained for three years after the change is made.

(33) Records of Personnel Monitoring. Each licensee shall maintain the following exposure records specified in .04(19):

(a) Direct reading dosimeter readings and yearly operability checks required by .04(19)(b). and .04(19)(c) for three years after the record is made;

(b) Records of alarming ratemeter calibrations for three years after the record is made;

(c) Reports received from the personal dosimeter processor until the Department terminates the license; and

(d) Records of estimates of exposures as a result of off-scale personal direct reading dosimeters, or lost or damaged personnel monitoring device, until the Department terminates the license.

(34) Records of Radiation Surveys. Each licensee shall maintain a record of each exposure device survey conducted before the device is placed in storage as specified in .04(20)(c). Each record must be maintained for three years after it is made.

(35) Form of Records. Each record required by these rules must be legible throughout the specified retention period. The record may be the original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of reproducing a clear copy throughout the required retention period. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records, such as letters, drawings, and specifications, must include all pertinent information, such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

Rule.04(36)

(36) Location Of Documents and Records.

(a) Each licensee shall maintain copies of records required by this Rule and other applicable Rules of this Chapter at the location specified in .04(4)(k).

~~(d) Records Required at Temporary Job Sites. Each licensee conducting industrial radiography at a temporary site shall have the following records available at that site for inspection by the Department:~~

(b) Each licensee shall also maintain current copies of the following documents and records sufficient to demonstrate compliance at each applicable field station and each temporary job site:

1. ~~Appropriate license;~~ The license authorizing the use of sources of radiation;

2. Operating and emergency procedures as required by .04(32);

3. ~~Applicable Regulations;~~ A copy of Rules .02., .03, .04, of this Chapter;

4. Survey records required ~~pursuant to (7)(c)4.~~ by .04(34) and Rule .03(8) of this Chapter as applicable ~~of this Rule~~ for the period of operation at the site;

5. ~~Daily pocket dosimeter records for the period of operation at the site;~~ Records of dosimeter readings as required by .04(33);

6. Valid radiographer's identification cards issued by a certifying entity for each radiographer working at the temporary job site or field location;

7. Evidence of t~~T~~he latest instrument calibration of the radiation survey instruments ~~and leak test records for specific devices~~ in use at the site as required by .04(25); ~~Acceptable records include tags or labels which are affixed to the device or survey meter~~.

8. Utilization logs for each source of radiation dispatched from that location as required by .04(28);

9. Records of equipment problems identified in daily checks of equipment as required by .04(29)(a);

Rule.04(36)(b)10.

10. Records of alarm system and entrance control checks required by .04(30), if applicable;

11. Evidence of the latest calibrations of alarming ratemeters and operability checks of dosimeters as required by .04(33);

12. The shipping papers for the transportation of radioactive materials required by Rule .06 of this Chapter; and

13. When operating under reciprocity pursuant to Rule 391-3-17-.02(20) of this Chapter, a copy of the applicable Agreement State license, Licensing State license, or Nuclear Regulatory Commission license authorizing the use of sources of

radiation.

(37)~~(5)(j)~~ ~~Reporting Requirements~~Notifications.

(a)~~1.~~ In addition to the reporting requirements specified in 10CFR 30.50 and in Rule 391-3-17 .03 ~~under other sections~~ of this Chapter, each licensee shall provide a written report to the Department within 30 days of the occurrence of any of the following incidents involving radiographic equipment:

1.~~(i)~~ Unintentional disconnection of the source assembly from the control cable.

2.~~(ii)~~ Inability to retract the source assembly to its fully shielded position and secure it in this position.

3.~~(iii)~~ Failure of any component which is ~~(~~critical to safe operation of the device~~)~~, to properly perform its intended function.

(b)~~2.~~ The licensee shall include the following information in each report submitted under (~~5~~37)(ja)1. of this Rule and in each report of overexposure submitted under Rule 391-3-17-.03(15)(c) which involves failure of safety components of radiography equipment:

1.~~(i)~~ A description of the equipment problem~~.~~;

2.~~(ii)~~ Cause of each incident, if known~~.~~;

3.~~(iii)~~ Name of the manufacturer and model number of equipment involved in the incident~~.~~;

Rule.04(37)(b)4

. 4.~~(iv)~~ Place, time, and date of the incident~~.~~;

5.~~(v)~~ Actions taken to establish normal operations~~.~~;

6.~~(vi)~~ Corrective actions taken or planned to prevent recurrence~~.~~; and

7.~~(vii)~~ Qualifications of personnel involved in the incident.

(c)~~3.~~ ~~Reports of overexposures submitted under Rule 391-3-17-.03(14)(c) which involve failure of safety components of radiography equipment must also include the information specified in (5)(j)2. of this Rule.~~Any licensee conducting radiographic operations or storing sources of radiation at any location not listed on the license for a period in excess of 180 days in a

calendar year, shall notify the Department prior to exceeding the 180 days.

(38)~~(10)~~ ~~Certification~~ Application and Examinations.

(a) Application

1. Candidates for certification must submit to the Department a fully completed "Georgia Certification of Radiographers Application Form" accompanied by two passport-sized photographs and shall submit through the Department all fees required by the testing agency. ~~This application provides for documentation of work experience and training. The candidate must provide documentation of having completed a practical exam given by a State-approved testing agency with the application.~~

2. A non-refundable fee to cover the cost of the examination, training documentation review, and issuance of certification shall be submitted with the application.

3. The application and the non-refundable fee shall be submitted to the Department, and the fees shall be submitted through the Department to the testing agency, on or before the dates specified by the Department.

4. An individual whose ~~identification~~ certification ID card has been suspended or revoked shall obtain written approval from the Department to apply to retake the examination.

~~1. Candidates for certification must have the following minimum documented training and experience:~~

Rule.04(38)(b)

~~(i) Forty (40) hours of formal classroom instruction in radiation safety topics; and~~

~~(ii) Thirty days of actual hands-on experience for the gamma-ray category. Experience must be acquired under the control of a license granted by the U.S. Nuclear Regulatory Commission (US NRC), or by an Agreement State.~~

(b) Examination. The examination shall be given for the purpose of determining the qualifications of applicants.

1. A written examination shall be held at times and places determined by the Department. The scope of the examination and the methods of procedure, including determination of the passing score, shall be prescribed by the Department. The examination will ~~emphasize~~ assess the applicant's knowledge to safely use sources of radiation and related equipment and the applicant's knowledge of this Chapter.

2. The examination will be administered by the Department to persons authorized by the Department.

3.~~2.~~ A candidate failing an examination may apply for re-examination in accordance with (~~10~~)(38)(a) of this Rule and will be re-examined. A candidate shall not retake the same version of the Department-administered examination.

4.~~3.~~ The examination will be held in Atlanta and other locations designated by the Department. ~~The examination shall normally be offered once each month.~~ Dates, times, and locations of the examination will be furnished by the Department.

5.~~4.~~ The examination will be in the English language.

6.~~5.~~ To take the examination, an individual shall have a picture identification card, ~~(~~such as a ~~Georgia~~ driver's license~~)~~, at the time of the examination.

7.~~6.~~ Calculators will be permitted during the examination. However, calculators or computers with preprogrammed data or formulas, including exposure calculators, will not be permitted during the examination.

Rule.04(38)(b)8

8.~~7.~~ The examination will be a "closed-book" examination.

9.~~8.~~ Any individual observed by a Department proctor to be compromising the integrity of the examination shall be required to surrender the examination, the answer sheet, and any work paper. Such individual will not be allowed to complete the examination, will forfeit the examination fee, and will leave the examination site to avoid disturbing other examinees. Such individuals may resubmit a new application and an additional examination fee and must wait at least
90 days before taking a new examination.

10.~~9.~~ Examination material shall be returned to the Department at the end of the examination. No photographic or other copying of examination questions or materials shall be permitted. Disclosure by an individual of the contents of any examination prior to its administration is prohibited.

11.~~10.~~ The names and scores of individuals taking the examination shall be a public record.

(39)~~(c)~~ Certification Identification (ID) Card.

(a)~~1.~~ ~~An~~ certification (ID) ~~identification~~ card shall be issued to each person who successfully completes the requirements of .04(~~10~~16)(a)~~2~~1. ~~of this Rule~~ and the examination prescribed in .04(~~1038~~)(b) ~~of this Rule~~.

1.~~2.~~ Each person's identification card shall contain his/her photograph. The applicants will provide two passport-sized photographs at the time the examination is administered.

2~~3.~~ The ~~identification~~ certification ID card remains the property of the State of Georgia and may be revoked ~~under the provisions of (10)(f) of this Rule.~~ or suspended.

3.~~4.~~ Any individual who wishes to replace ~~his/her identification~~ their ID card shall submit to the Department a written request for a replacement ~~identification~~ certification card, stating the reason a replacement ~~identification~~ certification card is needed. A non-refundable fee shall be paid through the Department to the issuing agency for each replacement of an ~~identification~~ certification card. The prescribed fee shall be submitted with the written request for a replacement ~~identification~~
Rule.04(39)(a)3.

certification card. The individual shall maintain a copy of the request in ~~his/her~~ their possession while performing industrial radiographic operations until a replacement ~~identification~~ certification card is received from the Department.

~~(d) Expiration of Identification Card.~~

(b) Each ~~identification~~ certification ID card is valid for a period of five years, unless revoked in accordance with .04(~~10~~39)(~~f~~d) ~~of this Rule~~. Each ~~identification~~ certification ID card expires at the end of the last day of the month and year stated on the ~~identification~~ certification ID card.

(c)~~(e)~~ Renewal of ~~Identification~~ certification ID Card.

1. Applications for examination to renew ~~an identification~~ certification ID card shall be filed in accordance with .04 (~~10~~38)(a) ~~of this Rule~~.

2. The examination for renewal of an ~~identification~~ certification ID card shall be administered in accordance with .04(~~10~~38)(b) ~~of this Rule~~.

3. A renewal identification card shall be issued in accordance with .04(~~10~~39)(~~ea~~) ~~of this Rule~~.

(d)~~(f)~~ Revocation or suspension of ~~an Identification~~ certification ID Card.

1. ~~"An identification card may be revoked for any violation of the provisions of this Chapter."~~ Any radiographer who violates these regulations, equivalent State or Nuclear Regulatory Commission regulations, or any applicable statutory requirements may be required to show cause at a formal hearing why their certification ID card should not be revoked or suspended in accordance with .04(39)(d)2.

2. When a Department order has been issued for an industrial radiographer to cease and desist from the use of sources of radiation or the Department revokes or suspends their certification ID card, the industrial radiographer shall surrender the certification ID card to the Department until the order is changed or the suspension expires.

(40) Reciprocity.

(a) All reciprocal recognition of licenses by the Department will be granted in Rule.04(40)(a)

accordance with Rule 391-3-17-.02(20) of this Chapter.

(b) Reciprocal recognition by the Department of an individual radiographer certification will be granted provided that:

1. The individual holds a valid certification in the appropriate category issued by a certifying entity, as defined in .04(3);

2. The requirements and procedures of the certifying entity issuing the certification affords the same or comparable certification standards as those afforded by .04(16)(a);

3. The applicant presents the certification to the Department prior to entry into the state; and

4. No escalated enforcement action is pending with the Nuclear Regulatory Commission or in any other state.

(c) Certified individuals who are granted reciprocity by the Department shall maintain the certification upon which the reciprocal recognition was granted, or prior to the expiration of such certification, shall meet the requirements of .04(16)(a).

(41)~~(8)~~ Specific Requirements for Radiographic Personnel Performing Industrial Radiography.

(a) The licensee shall supply the following at the job site:

1. At least one operable, calibrated survey instrument for each exposure device in use;

2. A current whole body ~~personnel monitor (TLD or film badge)~~ personal dosimeter for each individual;

3. An operable, calibrated pocket dosimeter with a range of zero to 200 milliroentgens for each ~~worker~~ person performing radiographic operations;

4. An operable, calibrated alarm ratemeter with preset dose-rate of 500 mr (5 mSv) per hour for each ~~worker~~ person performing radiographic operations using a radiographic exposure device; and

Rule.04(41)(a)5.

5. The appropriate barrier ropes and signs.

(b) Each radiographer at a job site shall have on their person a valid certification ID card issued by a certifying entity.

(c)~~(b)~~ Industrial radiographic operations shall not be performed if any of the items in .04(841)(a) or .04(41)(b) ~~of this Rule~~ are not available at the job site or are inoperable.

(d)~~(c)~~ Each licensee shall provide as a minimum two-person crews, i.e. two radiographers or a radiographer ~~trainee~~ assistant who is under the personal supervision of a radiographer ~~instructor~~, when sources of radiation are used at temporary job sites.

(e)~~(d)~~ No individual other than a radiographer or a radiographer ~~trainee~~ assistant who is under the personal supervision of a radiographer ~~instructor~~ shall manipulate controls or operate equipment used in industrial radiographic operations.

(f)~~(e)~~ During an inspection by the Department, the Department inspector may terminate an operation if any of the items in .04(841)(a) ~~of this Rule~~ are not available and operable or if the required number of radiographic personnel are not present. Operations shall not be resumed until such conditions are met.

~~(f) No individual shall act as a radiographer instructor unless such individual:~~

~~1. Has met the requirements of (6)(a)2. of this Rule;~~

~~2. Has one year of documented experience as a radiographer; and~~

~~3. Has been named as a radiographer instructor on the license issued by the Department.~~

(g) Special Requirements for Enclosed Radiography. Systems for enclosed radiography designed to allow admittance of individuals shall:

1. Comply with all applicable requirements of this Rule and Rule 391-3-17-.03(5)(i) and

2. Be evaluated at intervals not to exceed one year to assure compliance with the applicable requirements as specified in .04(841)(g)1.~~ of this Rule~~. Records of these evaluations shall be maintained for inspection

Rule.04(41)(g)2.

by the Department for a period of two years after the evaluation.

(h) Prohibitions. Industrial radiography performed with a sealed source which is not fastened to or contained in a radiographic exposure device (fishpole technique) is prohibited unless specifically authorized in a license issued by the Department.

APPENDIX A

I. Requirements for an Independent Certifying Organization.

An independent certifying organization shall:

1. Be an organization such as a society or association, whose members participate in, or have an interest in, the field of industrial radiography;

2. Make its membership available to the general public nationwide. Membership shall not be restricted because of race, color, religion, sex, age, national origin or disability;

3. Have a certification program open to non-members, as well as members;

4. Be an incorporated, nationally-recognized organization, that is involved in setting national standards of practice within its fields of expertise;

5. Have an adequate staff, a viable system for financing its operations, and a policy and decision-making review board;

6. Have a set of written organizational by-laws and policies that provide adequate assurance of lack of conflict of interest and a system for monitoring and enforcing those by-laws and policies;

7. Have a committee, whose members can carry out their responsibilities impartially, to review and approve the certification guidelines and procedures, and to advise the organization's staff in implementing the certification program;

8. Have a committee, whose members can carry out their responsibilities impartially, to review complaints against certified individuals and to determine appropriate sanctions;

9. Have written procedures describing all aspects of its certification program, maintain records of the current status of each individual's certification and the administration of its certification program;

10. Have procedures to ensure that certified individuals are provided due process with respect to the administration of its certification program, including the process of becoming certified and any sanctions imposed against certified individuals;

11. Have procedures for proctoring examinations, including qualifications for proctors. These procedures must ensure that the individuals proctoring each examination are not employed by the same company or corporation (or a

wholly-owned subsidiary of such company or corporation) as any of the examinees;

12. Exchange information about certified individuals with the Nuclear Regulatory Commission and other independent certifying organizations and/or Agreement States and allow periodic review of its certification program and related records; and

13. Provide a description to the Nuclear Regulatory Commission of its procedures for choosing examination sites and for providing an appropriate examination environment.

II. Requirements for Certification Programs.

All certification programs must:

1. Require applicants for certification to (a) receive training in the topics set forth in .04(16)(g) or equivalent State or Nuclear Regulatory Commission regulations, and (b) satisfactorily complete a written examination covering these topics;

2. Require applicants for certification to provide documentation that demonstrates that the applicant has:

   (a) received training in the topics set forth in .04(16)(g) or equivalent State or Nuclear Regulatory Commission regulations;

   (b) satisfactorily completed a minimum period of on-the-job training as specified in .04(16)(a); and

   (c) received verification by a State licensee or a Nuclear Regulatory Commission licensee that the applicant has demonstrated the capability of independently working as a radiographer.

3. Include procedures to ensure that all examination questions are protected from disclosure;

4. Include procedures for denying an application and revoking, suspending, and reinstating a certification;

5. Provide a certification period of not less than three years nor more than five years;

6. Include procedures for renewing certifications and, if the procedures allow renewals without examination, require evidence of recent full-time employment and annual refresher training; and

7. Provide a timely response to inquiries, by telephone or letter, from members of the public, about an individual's certification status.

III. Requirements for Written Examinations

All examinations must be:

1. Designed to test an individual's knowledge and understanding of the topics listed in .04(16)(g) or equivalent State or Nuclear Regulatory Commission requirements;

2. Written in a multiple-choice format;

3. Have test items drawn from a question bank containing psychometrically valid questions based on the material in .04(16)(g).

Authority Ga. L. 1964, pp. 499, 507, 566-575, as amended (Georgia Radiation Control Act). Administrative History.