Virginia Administrative Code
Title 12. Health
Agency 5. Department of Health
Chapter 481. Virginia Radiation Protection Regulations

12VAC5-481-600. Purpose.

Part IV. Standards For Protection Against Radiation

Article 1. General Provisions

A. Part IV (12VAC5-481-600 et seq.) of this chapter establishes standards for protection against ionizing radiation resulting from activities conducted pursuant to licenses or registrations issued by the agency. These regulations are issued pursuant to the Act, as amended.

B. The requirements of Part IV (12VAC5-481-600 et seq.) of this chapter are designed to control the receipt, possession, use, transfer, and disposal of sources of radiation by any licensee or registrant so 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 Part IV (12VAC5-481-600 et seq.) of this chapter. However, nothing in Part IV (12VAC5-481-600 et seq.) of this chapter shall be construed as limiting actions that may be necessary to protect health and safety in an emergency.

12VAC5-481-610. Scope.

Except as specifically provided in other parts of these regulations, Part IV (12VAC5-481-600 et seq.) of this chapter applies to persons licensed or registered by the agency to receive, possess, use, transfer, or dispose of sources of radiation. The limits in Part IV (12VAC5-481-600 et seq.) of this chapter 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.

12VAC5-481-620. Implementation.

A. Any existing license or registration condition that is more restrictive than Part IV (12VAC5-481-600 et seq.) of this chapter remains in force until there is an amendment or renewal of the license or registration.

B. If a license or registration condition exempts a licensee or registrant from a provision of Part IV (12VAC5-481-600 et seq.) of this chapter in effect on or before September 20, 2006, it also exempts the licensee or registrant from the corresponding provision of Part IV (12VAC5-481-600 et seq.) of this chapter.

C. If a license or registration condition cites provisions of Part IV (12VAC5-481-600 et seq.) of this chapter in effect prior to September 20, 2006, which do not correspond to any provisions of Part IV (12VAC5-481-600 et seq.) of this chapter, the license or registration condition remains in force until there is an amendment or renewal of the license or

registration that modifies or removes this condition.

12VAC5-481-630. Radiation Protection Programs.

Article 2. Radiation Protection Programs

A. Each licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of this chapter.

B. The licensee shall use, to the extent 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 periodically (not to exceed 12 months) review the radiation protection program content and implementation.

D. To implement the ALARA requirements of subsection B of this section, and notwithstanding the requirements of 12VAC5-481-720 , 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 10 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 12VAC5-481-1110 and promptly take appropriate corrective action to ensure against recurrence.

12VAC5-481-640. Occupational Dose Limits for Adults.

Article 3. Occupational Dose Limits

A. The licensee shall control the occupational dose to individual adults, except for planned special exposures under 12VAC5-481-690 , to the following dose limits.

1. An annual limit, which is the more limiting of:

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

    b. The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rem (0.5 Sv).

2. The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities, which are:

    a. A lens dose equivalent of 15 rem (0.15 Sv), and

    b. A shallow-dose equivalent of 50 rem (0.5 Sv) to the skin of the whole body or to the skin of any extremity.

B. 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 in accordance with 12VAC5-481-690 A 5.

C. When the external exposure is determined by measurement with an external personal monitoring device, the deep-dose equivalent shall be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the agency. The assigned deep-dose equivalent shall be for the part of the body receiving the highest exposure. The assigned shallow-dose equivalent shall be the dose averaged over the contiguous 10 square centimeters of skin receiving the highest exposure. The deep-dose equivalent, 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.

D. Derived air concentration (DAC) and annual limit on intake (ALI) values are presented in Appendix B to 10 CFR Part 20 and may be used to determine the individual's dose (see 12VAC5-481-1040) and to demonstrate compliance with the occupational dose limits.

E. In addition to the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity (see Appendix B to 10 CFR Part 20).

F. 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 (see 12VAC5-481-1020).

12VAC5-481-650. Compliance with Requirements for Summation of External and Internal Doses.

A. If the licensee is required to monitor under subdivisions 1 and 2 of 12VAC5-481-760 , the licensee shall demonstrate compliance with the dose limits by summing external and internal doses. If the licensee is required to monitor only under subdivision 1 of 12VAC5-481-760 or only under subdivision 2 of 12VAC5-481-760 , then summation is not required to demonstrate compliance with the dose limits. The licensee may demonstrate compliance with the requirements for summation of external and internal doses by meeting one of the conditions specified in subsections B, C, and D of this section. 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.

B. 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:

1. The sum of the fractions of the inhalation ALI for each radionuclide,

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

3. The sum of the calculated committed effective dose equivalents to all significantly irradiated organs or tissues calculated from bioassay data using appropriate biological models and expressed as a fraction of the annual limit. For the 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 and the committed dose equivalent per unit intake is greater than 10% of the maximum weighted value of the committed dose equivalent per unit intake of any organ or tissue.

C. Intake by oral ingestion. If the occupationally exposed individual also receives an intake of radionuclides by oral ingestion greater than 10% of the applicable oral ALI, the licensee shall account for this intake and include it in demonstrating compliance with the limits.

D. 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.

12VAC5-481-660. Determination of External Dose from Airborne Radioactive Material.

A. Licensees shall, when determining the dose from airborne radioactive material, include the contribution to the deep-dose equivalent, lens dose equivalent, and shallow-dose equivalent from external exposure to the radioactive cloud (see Appendix B to 10 CFR Part 20).

B. Airborne radioactive measurements and DAC values shall not be used as the primary means to assess the deep dose equivalent when the airborne radioactive materials 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.

12VAC5-481-670. Determination of Internal Exposure.

A. For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required under 12VAC5-481-760 , take suitable and timely measurements of either:

1. Concentrations of radioactive materials in air in work areas;

2. Quantities of radionuclides in the body;

3. Quantities of radionuclides excreted from the body; or

4. Combinations of these measurements.

B. Unless respiratory protective equipment is used as provided in 12VAC5-481-830 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.

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

may:

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

2. Upon prior approval from the agency, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material (e.g., aerosol size distribution or density); and

3. Separately assess the contribution of fractional intakes of Class D, W, or Y compounds of a given radionuclide (see Appendix B to 10 CFR Part 20) to the committed effective dose equivalent.

D. If the licensee chooses to assess intakes of Class Y material using the measurements given in subdivision A 2 or A 3 of this section, the licensee may delay the recording and reporting of the assessments for periods up to seven months, unless otherwise required by 12VAC5-481-1100 or 12VAC5-481-1110 , in order to permit the licensee to make additional measurements basic to the assessments.

E. 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:

1. The sum of the ratios of the concentration to the appropriate DAC value (e.g., D, W, or Y) from Appendix B to 10 CFR Part 20 for each radionuclide in the mixture; or

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

F. 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.

G. When a mixture of radionuclides in air exists, licensees may disregard certain radionuclides in the mixture if:

1. The licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in 12VAC5-481-640 and in complying with the monitoring requirements in 12VAC5-481-760 A 2,

2. The concentration of any radionuclide disregarded is less than 10% of its DAC, and

3. The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30%.

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

1. 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 rem (0.05 Sv) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent.

2. When the ALI and the associated DAC is determined by the nonstochastic organ dose limit of 50 rem (0.5 Sv), the intake of radionuclides that would result in a committed effective dose equivalent of 5 rem (0.05 Sv) (the stochastic ALI) is listed in parentheses of Appendix B to 10 CFR Part 20. In this case, the licensee may, as a simplifying assumption, use the stochastic ALIs to determine committed effective dose equivalent. However, if the licensee uses the stochastic ALIs, the licensee shall also demonstrate that the limit in 12VAC5-481-640 A 1 (b) is met.

12VAC5-481-680. Determination of Prior Occupational Dose.

A. For each individual who may enter the licensee's or registrant's restricted area and is likely to receive, in a year, an occupational dose requiring monitoring pursuant to 12VAC5-481-760 , the licensee or registrant shall determine the occupational radiation dose received during the current year.

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

1. The internal and external doses from all previous planned special exposures; and

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

C. In complying with the requirements of subsection A or B of this section, a licensee or registrant may:

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

2. Accept, as the record of lifetime cumulative radiation dose, an up-to-date occupational radiation exposure form provided by the agency 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 or registrant; and

3. Obtain reports 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 or registrant, by telephone, telegram, facsimile, or letter. The licensee or registrant shall request a written verification of the dose data if the authenticity of the transmitted report cannot be established.

D. Do the following:

1. The licensee or registrant shall record the exposure history, as required by this section on an occupational radiation exposure form provided by the agency, or other clear and legible record, of all 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 or registrant obtains reports, the licensee or registrant shall use the dose shown in the report in preparing the occupational radiation exposure form provided by the agency or equivalent. For any period in which the licensee or registrant does not obtain a report, the licensee or registrant shall place a notation on the occupational radiation exposure form provided by the agency or equivalent indicating the periods of time for which data are not available.

2. Licensees or registrants are not required to partition historical dose between external dose equivalent(s) and internal committed dose equivalent(s). Further, occupational exposure histories obtained and recorded on the occupational radiation exposure form provided by the agency or equivalent before September 20, 2006, 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.

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

1. In establishing administrative controls pursuant to 12VAC5-481-640 for the current year, that the allowable dose limit for the individual is reduced by 12.5 mSv (1.25 rem) for each quarter for which records were unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure; and

2. That the individual is not available for planned special exposures.

F. The licensee or registrant shall retain the records on an occupational radiation exposure form provided by the agency or equivalent until the agency terminates each pertinent license or registration requiring this record. The licensee or registrant shall retain records used in preparing the occupational radiation exposure form provided by the agency or equivalent for three years after the record is made.

12VAC5-481-690. 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 12VAC5-481-640 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 dose estimated to result from the planned special exposure are unavailable or impractical.

2. 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:

a. Informed of the purpose of the planned operation;

b. 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

c. Instructed in the measure 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 12VAC5-481-1020 during the lifetime of the individual for each individual involved.

5. Subject to 12VAC5-481-640 A 2, the licensee does 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:

a. The numerical values of any of the dose limits in 12VAC5-481-640 A 1 in any year; and

b. Five times the annual dose limits in 12VAC5-481-640 A 1 during the individual's lifetime.

6. The licensee maintains records of the conduct of a planned special exposure in accordance with 12VAC5-481-1030 and submits a written report in accordance with 12VAC5-481-1120 .

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 from the date of the planned special exposure. The dose from planned special exposures is not be considered in controlling future occupational dose limits of the individual under 12VAC5-481-640 A 1 but is to be included in evaluations required by subdivisions 4 and 5 of this section.

12VAC5-481-700. Occupational Dose Limits for Minors.

The annual occupational dose limits for minors are 10% of the annual dose limits specified for adult workers in 12VAC5-481-640 .

12VAC5-481-710. Dose to an Embryo/Fetus.

A. The licensee shall ensure that the dose equivalent to the embryo/fetus during the entire pregnancy due to occupational exposure of a declared pregnant woman does not exceed 500 millirem (5 mSv).

B. The licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limits in subsection A of this section.

C. The dose equivalent to the embryo/fetus is the sum of:

1. The deep dose equivalent to the declared pregnant woman; and

2. The dose equivalent to the embryo/fetus resulting from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman.

D. If the dose equivalent to the embryo/fetus is found to have exceeded 500 millirem (5 mSv),

or is within 50 millirem (0.5 mSv) of this dose, by the time the woman declares the pregnancy to the licensee, the licensee shall be deemed to be in compliance with subsection A of this section if the additional dose equivalent to the embryo/fetus does not exceed 50 millirem (0.5 mSv) during the remainder of the pregnancy.

12VAC5-481-720. Dose Limits for Individual Members of the Public.

Article 4. Radiation Dose Limits for Individual Members of the Public

A. Each licensee shall conduct operations so that:

1. The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 100 millirem (1 mSv) in a year exclusive of the dose contribution from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released under 12VAC5-481-1870 , from voluntary participation in medical research programs, and from the licensee's disposal of radioactive material into sanitary sewerage in accordance with 12VAC5-481-930; and

2. The dose in any unrestricted area from external sources exclusive of the dose contribution from individuals administered radioactive material and released in accordance with 12VAC5-481-1870 does not exceed 2 millirem (0.02 millisievert) in any one hour.

B. If the licensee permits members of the public to have access to controlled areas, the limits for members of the public continue to apply to those individuals.

C. Notwithstanding subdivision A 1 of this section, a licensee may permit visitors to an individual who cannot be released under 12VAC5-481-1870 to receive a radiation dose greater than 100 millirem (1 mSv) if:

1. The radiation dose received does not exceed 500 millirem (5 mSv); and

2. The authorized user as defined in 12VAC5-481-10 has determined before the visit that it is appropriate.

D. A licensee or licensee applicant may apply for prior agency authorization to operate up to an annual dose limit for an individual member of the public of 500 millirem (5 mSv). The licensee or license applicant shall include the following information in this application:

1. Demonstration of the need for and the expected duration of operations in excess of the limit in subsection A of this section;

2. The licensee's program to assess and control dose within the 500 millirem (5 mSv) annual limit; and

3. The procedures to be followed to maintain the dose as low as is reasonably achievable.

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

F. The agency 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.

12VAC5-481-730. Compliance with Dose Limits for Individual Members of the Public.

A. The licensee shall make or cause to be made, as appropriate, surveys of radiation levels in unrestricted and controlled areas and radioactive materials in effluents released to unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public in 12VAC5-481-720 .

B. A licensee shall show compliance with the annual dose limits in 12VAC5-481-720 by:

1. 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

2. Demonstrating that:

a. 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 2 of Appendix B to 10 CFR Part 20; and

b. If an individual were continuously present in an unrestricted area, the dose from external sources would not exceed 2 millirem (0.02 mSv) in an hour and 50 millirem (0.5 mSv) in a year.

C. Upon approval from the agency, the licensee may adjust the effluent concentration values in Table 2 of Appendix B to 10 CFR Part 20, 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).

12VAC5-481-740. Testing for Leakage or Contamination of Sealed Sources.

Article 5. Testing for Leakage or Contamination of Sealed Sources

A. The licensee or registrant in possession of any sealed source shall assure that:

1. Each sealed source, except as specified in subsection B of this section, is tested for leakage or contamination and the test results are received before the sealed source is put into use unless the licensee or registrant has a certificate from the transferor indicating that the sealed source was tested within six months before transfer to the licensee or registrant;

2. Each sealed source that is not designed to emit alpha particles is tested for leakage or contamination at intervals not to exceed six months or at alternative intervals approved by the agency, after evaluation of information specified by 12VAC5-481-480 J 4 and 5, the NRC or another agreement state;

3. Each sealed source that is designed to emit alpha particles is tested for leakage or contamination at intervals not to exceed three months or at alternative intervals approved by the agency, after evaluation of information specified by 12VAC5-481-480 J 4 and 5, the NRC or another agreement state;

4. For each sealed source that is required to be tested for leakage or contamination, at any other time there is reason to suspect that the sealed source might have been damaged or might be leaking, the licensee or registrant shall assure that the sealed source is tested for leakage or contamination before further use;

5. Tests for leakage for all sealed sources, except brachytherapy sources manufactured to contain radium, shall be capable of detecting the presence of 185 Bq (0.005 µCi) 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 a sealed source contained in a device, test samples are obtained when the source is in the "off" position;

6. The test for leakage for brachytherapy sources manufactured to contain radium shall be capable of detecting an absolute leakage rate of 37 Bq (0.001 µCi) 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;

7. Tests for contamination from radium daughters shall be taken on the interior surface of brachytherapy source storage containers and shall be capable of detecting the presence of 185 Bq (0.005 µCi) of a radium daughter which has a half-life greater than four days.

B. A licensee or registrant need not perform test for leakage or contamination on the following sealed sources:

1. Sealed sources containing only radioactive material with a half-life of less than 30 days;

2. Sealed sources containing only radioactive material as a gas;

3. Sealed sources containing 3.7 MBq (100 µCi) or less of beta or photon-emitting material or 370 kBq (10 µCi) or less of alpha-emitting material;

4. Sealed sources containing only hydrogen-3;

5. Seeds of iridium-192 encased in nylon ribbon; and

6. Sealed sources that are stored, not being used and identified as in storage. The licensee or registrant shall, however, test each such sealed source for leakage or contamination and receive the test results at intervals not to exceed five years and within six months before the date of use or transfer.

C. Tests for leakage or contamination from sealed sources shall be performed by persons specifically authorized by the agency, the NRC or another agreement state to perform such services.

D. Test results shall be kept in units of becquerel or microcurie and maintained for inspection

by the agency. Records of test results for sealed sources shall be made pursuant to 12VAC5-481-1010 .

E. The following shall be considered evidence that a sealed source is leaking:

1. The presence of 185 Bq (0.005 µCi) or more of removable contamination on any test sample;

2. Leakage of 37 Bq (0.001 µCi) of radon-222 per 24 hours for brachytherapy sources manufactured to contain radium;

3. The presence of removable contamination resulting from the decay of 185 Bq (0.005 µCi) or more of radium.

F. The licensee or registrant shall immediately withdraw a leaking sealed source from use and shall take action to prevent the spread of contamination. The leaking sealed source shall be repaired or disposed of in accordance with this part.

G. Reports of test results for leaking or contaminated sealed sources shall be made pursuant to 12VAC5-481-1150 .

12VAC5-481-750. General.

Article 6. Surveys and Monitoring

A. Licensees shall make or cause to be made surveys of areas, including the subsurface, that:

1. Are necessary for the licensee to comply with this chapter; and

2. Are reasonable under the circumstances to evaluate:

a. The magnitude and extent of radiation levels;

b. The concentrations or quantities of radioactive material; and

c. The potential radiological hazards of the radiation levels and residual radioactivity detected.

B. Notwithstanding 12VAC5-481-1000 A, records from surveys describing the location and amount of subsurface residual radioactivity identified at the site shall be kept with records important for decommissioning, and such records shall be retained in accordance with 12VAC5-481-450 C 8.

C. Licensees shall ensure that the survey instruments used to show compliance with this chapter are calibrated before first use, annually (not to exceed 12 months), except when a more frequent interval is specified in another applicable part of this chapter or a license condition, and following a repair that affects the calibration. These calibrations shall include:

1. Use of a radiation source on all scales;

2. At energies appropriate for the use;

3. For linear scale instruments, at two points located approximately one-third and two-

thirds of full-scale on each scale; for logarithmic scale instruments, at mid-range of each decade, and at two points of at least one decade; and for digital instruments, at three points between 2 and 1000 mrem (0.02 and 10 millisieverts) per hour;

4. For dose rate instruments, so that an accuracy within plus or minus 20% of the true radiation dose can be demonstrated at each point checked; and

5. Conspicuously note on the instrument the date of calibration.

D. Licensees may not use survey instruments if the difference between the indicated exposure rate and the calculated exposure rate is more than 20%.

E. All personnel dosimeters, except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to the extremities, that require processing to determine the radiation dose and that are used by the licensee to comply with 12VAC5-481-640 , with other applicable provisions of this chapter, or with conditions specified in a license shall be processed and evaluated by a dosimetry processor with the following:

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

2. 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 radiation for which the individual wearing the dosimeter is monitored.

12VAC5-481-760. Conditions Requiring Individual Monitoring of External and Internal Occupational Dose.

Each licensee shall monitor exposures from sources of radiation at levels sufficient to demonstrate compliance with the occupational dose limits of this part. At a minimum:

1. Each licensee shall monitor occupational exposure to radiation from licensed and unlicensed radiation sources under the control of the licensee and shall supply and require the use of individual monitoring devices by:

a. Adults likely to receive, in one year from sources external to the body, a dose in excess of 10% of the limits in 12VAC5-481-640 A;

b. Minors likely to receive, in one year from radiation sources external to the body, a deep dose equivalent in excess of 100 millirem (1 mSv), a lens dose equivalent in excess of 150 millirem (1.5 mSv), or a shallow dose equivalent to the skin or to the extremities in excess of 500 millirem (5 mSv);

c. Declared pregnant women likely to receive, during the entire pregnancy, from radiation sources external to the body, a deep dose equivalent in excess of 100 millirem (1 mSv); and

d. Individuals entering a high or very high radiation area.

2. Each licensee shall monitor (see 12VAC5-481-670) the occupational intake of radioactive material by and assess the committed effective dose equivalent to:

a. Adults likely to receive, in one year, an intake in excess of 10% of the applicable ALIs in Table 1, Columns 1 and 2, of Appendix B to 10 CFR Part 20;

b. Minors likely to receive, in one year, a committed effective dose equivalent in excess of 100 millirem (1 mSv); and

c. Declared pregnant women likely to receive, during the entire pregnancy, a committed effective dose equivalent in excess of 100 millirem (1 mSv).

12VAC5-481-770. Location of Individual Monitoring Devices.

Each licensee or registrant shall ensure that individuals who are required to monitor occupational doses in accordance with 12VAC5-481-760 wear individual monitoring devices as follows:

1. An individual monitoring device used for monitoring the dose to the whole body shall be worn at the unshielded location of the whole body likely to receive the highest exposure. When a protective apron is worn, the location of the individual monitoring device is typically at the neck (collar);

2. An individual monitoring device used for monitoring the dose to an embryo/fetus of a declared pregnant woman, pursuant to 12VAC5-481-710 , shall be located at the waist under any protective apron being worn by the woman;

3. An individual monitoring device used for monitoring the eye dose equivalent, to demonstrate compliance with 12VAC5-481-640 , shall be located at the neck (collar), outside any protective apron being worn by the monitored individual, or at an unshielded location closer to the eye;

4. An individual monitoring device used for monitoring the dose to the extremities, to demonstrate compliance with 12VAC5-481-640 , shall be worn on the extremity likely to receive the highest exposure. Each individual monitoring device shall be oriented to measure the highest dose to the extremity being monitored.

12VAC5-481-780. Control of Access to High Radiation Areas.

Article 7. Control of Exposure from External Sources in Restricted Areas

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

1. 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 100 millirem (1 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates;

2. 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 entry; or

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

B. In place of the controls required by subsection A of this section for a high radiation area, the licensee may substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry.

C. A licensee may apply to the agency for approval of alternative methods for controlling access to high radiation areas.

D. The licensee shall establish the controls required by subsections A and C of this section in a way that does not prevent individuals from leaving a high radiation area.

E. Control is not required for 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 regulations of the U.S. Department of Transportation provided that:

1. The packages do not remain in the area longer than three days; and

2. The dose rate at one meter from the external surface of any package does not exceed 10 millirem (0.1 mSv) per hour.

F. Control of entrance or access to rooms or other areas in hospitals is not required 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 limits established in this part and to operate within the ALARA provisions of the licensee's radiation protection program.

G. The licensee or registrant 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 this section if the licensee or registrant has met all the specific requirements for access and control specified in other applicable parts of this chapter, such as Part V (12VAC5-481-1170 et seq.) for industrial radiography, Part VI (12VAC5-481-1580 et seq.) for X-rays in the healing arts, Part IX (12VAC5-481-2140 et seq.) for particle accelerators, and Part XII (12VAC5-481-2660 et seq.) for irradiators.

12VAC5-481-790. Control of Access to Very High Radiation Areas.

A. In addition to the requirements in 12VAC5-481-780 , the licensee or registrant shall institute 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 5 Gy (500 rad) or more in one hour at 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 nonself-shielded irradiators.

B. The licensee or registrant 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 described in subsection A of this section if the registrant has met all the specific requirements for access and control specified in other applicable parts of these regulations, such as Part V (12VAC5-481-1170 et seq.) for industrial radiography, Part VI (12VAC5-481-1580 et seq.) for X-rays in the healing arts, Part IX (12VAC5-481-2140 et seq.) for particle accelerators, and Part XII (12VAC5-481-2660 et seq.) for irradiators.

12VAC5-481-800. (Repealed.)

12VAC5-481-810. Use of Process or Other Engineering Controls.

Article 8. Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas

The licensee shall use, to the extent practical, process or other engineering controls (e.g., containment, decontamination, or ventilation) to control the concentration of radioactive material in air.

12VAC5-481-820. Use of Other Controls.

A. When it is not practical to apply process or other engineering controls to control the concentrations of radioactive material in the 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.

B. 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 the industrial health and safety of workers.

12VAC5-481-830. Use of Individual Respiratory Protection Equipment.

A. If the licensee assigns or permits the use of respiratory protection equipment to limit the intake of radioactive material:

1. The licensee shall use only respiratory protection equipment that is tested and certified by the National Institute for Occupational Safety and Health (NIOSH) except as otherwise noted in this part.

2. If the licensee wishes to use equipment that has not been tested or certified by NIOSH, or for which there is no schedule for testing or certification, the licensee shall submit an

application to the agency for authorized use of this equipment except as provided in this part. The application shall include evidence that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under anticipated conditions of use. This shall be demonstrated either by licensee testing or on the basis of reliable test information.

3. The licensee shall implement and maintain a respiratory protection program that includes:

a. Air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate doses;

b. Surveys and bioassays, as necessary, to evaluate actual intakes;

c. Testing of respirators for operability (i.e., user seal check for face sealing devices and functional check for others) immediately prior to each use;

d. Written procedures regarding:

(1) Monitoring, including air sampling and bioassays;

(2) Supervision and training of respirator users;

(3) Fit testing;

(4) Respirator selection;

(5) Breathing air quality;

(6) Inventory and control;

(7) Storage, issuance, maintenance, repair, testing, and quality assurance of respiratory protection equipment;

(8) Recordkeeping; and

(9) Limitations on periods of respirator use and relief from respirator use;

e. Determination by a physician that the individual user is medically fit to use respiratory protection equipment at the following stages:

(1) Before the initial fitting of a face sealing respirator;

(2) Before the first field use of non-face sealing respirators, and

(3) Either every 12 months thereafter, or periodically at a frequency determined by a physician; and

f. Fit testing, with fit factor greater than 10 times the assigned protection factor (APF) for negative pressure devices, and a fit factor greater than 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 shall be performed with the facepiece operating in the negative

pressure mode.

4. 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.

5. The licensee shall also consider limitations appropriate to the type and mode of use. 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.

6. 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 shall 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 (e.g., 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 shall be immediately available to assist all users of this type of equipment and to provide effective emergency rescue if needed.

7. Atmosphere-supplying respirators shall 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:

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

b. Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

c. Carbon monoxide (CO) content of 10 ppm or less;

d. Carbon dioxide content of 1,000 ppm or less; and

e. Lack of noticeable odor.

8. The licensee shall ensure that no objects, materials or substances, such as facial hair, or any conditions that interfere with the face (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.

9. 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 shall be used. If the dose is later found to be less than the estimated dose, the corrected value may be used.

B. The agency may impose restrictions in addition to the provisions of this section, 12VAC5-481-820 , and 12VAC5-481-3680 in order to:

1. Ensure that the respiratory protection program of the licensee is adequate to limit doses to individuals from intakes of airborne radioactive materials consistent with maintaining total effective dose equivalent ALARA; and

2. Limit the extent to which a licensee may use respiratory protection equipment instead of process or other engineering controls.

C. The licensee shall obtain authorization from the agency before using assigned protection factors in excess of those specified in 12VAC5-481-3680 . The agency 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.

12VAC5-481-840. Security and Control of Licensed or Registered Sources of Radiation.

Article 9. Security and Control of Licensed or Registered Sources of Radiation

A. The licensee shall:

1. Secure radioactive material from unauthorized removal or access when stored in controlled or unrestricted areas.

2. Control and maintain constant surveillance and use devices or administrative procedures to prevent unauthorized use of radioactive material that is in a controlled or unrestricted area and that is not in storage.

B. The registrant shall secure registered radiation machines from unauthorized removal.

C. The registrant shall use devices or administrative procedures to prevent unauthorized use of registered radiation machines.

D. Each portable gauge licensee shall use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal, whenever portable gauges are not under the control and constant surveillance of the licensee.

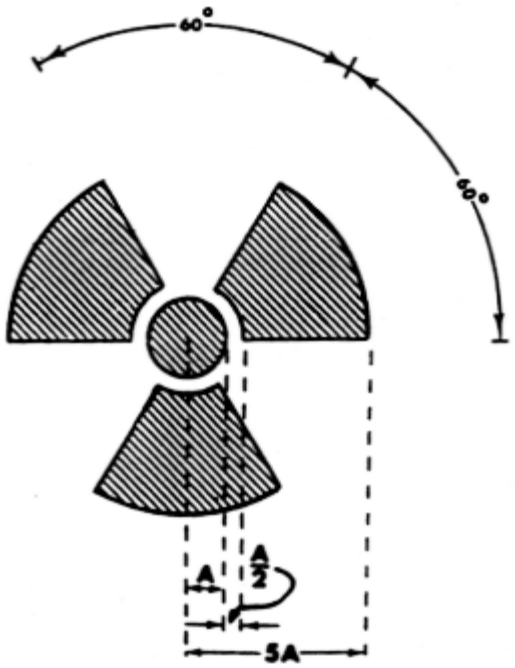
12VAC5-481-850. Radiation Symbol; Caution Signs.

Article 10. Precautionary Procedures

A. Unless otherwise authorized by the agency, the symbol prescribed by this section shall use

the colors magenta, purple, or black on a yellow background. The symbol prescribed by this section is the three-bladed design:

1. The cross-hatched area is to be magenta, purple, or black, and
2. The background is to be yellow.



RADIATION SYMBOL

B. Exception to color requirements for standard radiation symbol.Notwithstanding the requirements of subsection A of this section, 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 and without a color requirement.

C. Additional information on signs and labels. In addition to the contents of signs and labels prescribed in this section, the licensee may 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.

12VAC5-481-860. Posting Requirements.

A. Licensees shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol as described in 12VAC5-481-850 and the words "CAUTION, RADIATION AREA."

B. Licensees shall post each high radiation area with a conspicuous sign or signs bearing the radiation symbol as described in 12VAC5-481-850 and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA."

C. Licensees shall post each very high radiation area with a conspicuous sign or signs bearing the radiation symbol as described in 12VAC5-481-850 and the words "GRAVE DANGER, VERY

HIGH RADIATION AREA."

D. Licensees shall post each airborne radioactivity area with a conspicuous sign or signs bearing the radiation symbol as described in 12VAC5-481-850 and the words, "CAUTION, AIRBORNE RADIOACTIVITY AREA," or "DANGER, AIRBORNE RADIOACTIVITY AREA."

E. The licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in 12VAC5-481-3700 with a conspicuous sign or signs bearing the radiation symbol as described in 12VAC5-481-850 and the words "CAUTION, RADIOACTIVE MATERIALS" or "DANGER, RADIOACTIVE MATERIALS."

12VAC5-481-870. Exceptions to Posting Requirements.

A. Licensees are not required to post caution signs in areas or rooms containing radioactive materials for periods of less than eight hours, if the following conditions are met:

1. The materials are constantly attended during these periods by an individual who takes the precautions necessary to prevent the exposure of individuals to radiation or radioactive materials in excess of the limits established in this part; and

2. The area or room is subject to the licensee's control.

B. Rooms or other areas in hospitals that are occupied by patients are not required to be posted with caution signs pursuant to 12VAC5-481-860 , provided that the patient could be released from licensee control pursuant to 12VAC5-481-1870 .

C. A room or area is not required to be posted with a caution sign because of the presence of a sealed source, provided that the radiation level at 30 centimeters from the surface of the sealed source container or housing does not exceed 5 millirem (0.05 mSv) per hour.

D. Rooms in hospitals or clinics that are used for teletherapy are exempt from the requirement to post caution signs under 12VAC5-481-860 if

1. Access to the room is controlled pursuant to 12VAC5-481-2043; and

2. Personnel in attendance take necessary precautions to prevent the inadvertent exposure of workers, other patients, and members of the public to radiation in excess of the limits established in this part.

12VAC5-481-880. Labeling Containers and Radiation Machines.

A. Licensees shall ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol as described in 12VAC5-481-850 and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The label shall also provide sufficient 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.

B. Each registrant shall ensure that each radiation machine is labeled in a conspicuous manner that cautions individuals that radiation is produced when it is energized.

C. Licensees 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.

12VAC5-481-890. Exemptions to Labeling Requirements.

Licensees are not required to label:

1. Containers holding licensed material in quantities less than the quantities listed in 12VAC5-481-3700;

2. Containers holding licensed material in concentrations less than those specified in Appendix B to 10 CFR Part 20;

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 part;

4. Containers when they are in transport and packaged and labeled in accordance with regulations of the U.S. Department of Transportation;

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 readily available written record (e.g., 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 reactor components, piping, and tanks.

12VAC5-481-900. Procedures for Receiving and Opening Packages.

A. Licensees who expect to receive a package containing quantities of radioactive material in excess of a Type A quantity, as defined in 12VAC5-481-10 and 12VAC5-481-3770 , shall make arrangements to receive:

1. The package when the carrier offers it for delivery; or

2. Notification of the arrival of the package at the carrier's terminal and to take possession of the package expeditiously.

B. Licensees shall monitor the following:

1.The external surfaces of a labeled package for radioactive contamination unless the package contains only radioactive material in the form of a gas or in special form as defined in 12VAC5-481-10 ;

2. 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 12VAC5-481-10 and 12VAC5-481-3770; and

3. All packages known to contain radioactive material for radioactive contamination and radiation levels if there is evidence of degradation of package integrity, such as packages that are crushed, wet, or damaged.

C. Licensees shall perform the monitoring required by subsection B of this section as soon as practical after receipt of the package, but not later than three hours after the package is received at the licensee's facility if it is received during the licensee's normal working hours, if there is evidence of degradation of package integrity (e.g., packages that are crushed, wet, or damaged), or if it is received after working hours, not later than three hours from the beginning of the next working day.

D. Licensees shall immediately notify the final delivery carrier and the agency by telephone, when:

1. Removable contamination exceeds the limits of subdivision 9 of 12VAC5-481-3080; or

2. External radiation levels exceed the limits of subdivision 10 of 12VAC5-481-3080 .

E. Licensees shall:

1. Establish, maintain, and retain written procedures for safely opening packages in which radioactive material is received; and

2. Ensure that the procedures are followed and that due consideration is given to special instructions for the type of package being opened.

F. Licensees transferring special form sources in licensee-owned or licensee-operated vehicles to and from a work site are exempt from the contamination monitoring requirements of subsection B of this section, but are not exempt from the survey requirements in subsection B of this section for measuring radiation levels that are required to ensure that the source is still properly lodged in its shield.

12VAC5-481-910. General Requirements.

Article 11. Waste Disposal

A. Licensees shall dispose of licensed material only in the following ways:

1. By transfer to an authorized recipient as provided in 12VAC5-481-570;

2. By decay in storage;

3. By release in effluents within the limits of 12VAC5-481-720; or

4. As authorized under 12VAC5-481-920 , 12VAC5-481-930 , 12VAC5-481-940 , 12VAC5-481-950 , or 12VAC5-481-971 .

B. A person shall be specifically licensed to receive waste containing licensed material from other persons for the following actions:

1. Treatment prior to disposal;

2. Treatment or disposal by incineration;

3. Decay in storage;

4. Disposal at a land disposal facility licensed under Part XI (12VAC5-481-2330 et seq.) of this chapter; or

5. Disposal at a geologic repository under 10 CFR Part 60 or 10 CFR Part 63.

12VAC5-481-920. Method for Obtaining Approval of Proposed Disposal Procedures.

A licensee or registrant or applicant for a license or registration may apply to the agency for approval of proposed procedures, not otherwise authorized in these regulations, to dispose of licensed or registered material generated in the licensee's or registrant's operations. Each application shall include:

1. A description of the waste containing licensed or registered 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 Part IV (12VAC5-481-600 et seq.) of this chapter.

12VAC5-481-930. Disposal by Release into Sanitary Sewerage.

A. Licensees may discharge licensed material into sanitary sewerage if each of the following conditions is satisfied:

1. The licensed or other radioactive material is readily soluble or is readily dispersible biological material in water;

2. The quantity of licensed or other radioactive material that the licensee releases into the sewer in 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 3 of Appendix B to 10 CFR Part 20;

3. If more than one radionuclide is released, the following conditions shall also be satisfied:

a. The licensee shall determine the fraction of the limit in Table 3 of Appendix B to 10 CFR Part 20 represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in Table 3 of Appendix B to 10 CFR Part 20; and

b. The sum of the fractions for each radionuclide required by subdivision 3 a of this subsection does not exceed unity; and

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

B. Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in this section.

12VAC5-481-940. Treatment or Disposal by Incineration.

Licensees may treat or dispose of licensed material by incineration only if the material is in a form or concentration specified in 12VAC5-481-950 , or as specifically approved by the agency pursuant to 12VAC5-481-920 .

12VAC5-481-950. Disposal of Specific Wastes.

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

1. 0.05 µCi (1.85 kBq) or less of hydrogen-3 or carbon-14 per gram of medium used for liquid scintillation counting; and

2. 0.05 µCi (1.85 kBq) or less of hydrogen-3 or carbon-14 per gram of animal tissue, averaged over the weight of the entire animal.

B. Licensees may not dispose of tissue under subdivision A 2 of this section in a manner that would permit its use either as food for humans or as animal feed.

C. Licensees shall maintain records in accordance with 12VAC5-481-1060 .

12VAC5-481-960. Transfer for Disposal and Manifests.

A. The requirements of this section and 12VAC5-481-3710 are designed to accomplish the following:

1. Control transfers of low level radioactive waste by any waste generator, waste collector, or waste processor licensee that ships low level waste either directly or indirectly through a waste collector or waste processor to a licensed low level waste land disposal facility (as defined in 12VAC5-481-10);

2. Establish a manifest tracking system; and

3. Supplement existing requirements concerning transfers and recordkeeping for those wastes.

B. Licensees shipping radioactive waste intended for ultimate disposal at a licensed land disposal facility shall document the information required and transfer this recorded information to the intended consignee in accordance with 12VAC5-481-3710 .

C. Each shipment manifest shall include a certification by the waste generator as specified in 12VAC5-481-3710 G.

D. Each person involved in the transfer for disposal and disposal of waste, including the waste generator, waste collector, waste processor, and disposal facility operator, shall comply with the requirements specified in 12VAC5-481-3710 H.

E. Licensees shipping radioactive material as defined in subdivisions 3 and 4 under the definition of "byproduct material" in 12VAC5-481-10 intended for ultimate disposal at a land disposal facility licensed under Part XI (12VAC5-481-2330 et seq.) of this chapter, 10 CFR Part 61, or equivalent agreement state regulations shall document the information required on a manifest and transfer this recorded manifest information to the intended consignee in accordance with 12VAC5-481-3710 .

12VAC5-481-970. Compliance with Environmental and Health Protection Regulations.

Nothing in this part relieves the licensee from complying with other applicable federal, state, and local regulations governing any other toxic or hazardous properties of materials that may be disposed of under this part.

12VAC5-481-971. Disposal of Certain Radioactive Material.

A. Licensed material meeting the definition in subdivisions 3 and 4 of the definition of "byproduct material" in 12VAC5-481-10 may be disposed of in accordance with Part XI (12VAC5-481-2330 et seq.) of this chapter, even though it is not defined as low level radioactive waste. Therefore, any licensed byproduct material being disposed of at a facility or transferred for ultimate disposal at a facility licensed under Part XI (12VAC5-481-2330 et seq.) of this chapter, 10 CFR Part 61, or equivalent agreement state regulations shall meet the requirements of 12VAC5-481-960 .

B. A licensee may dispose of byproduct material, as defined in subsection A of this section, at a disposal facility authorized to dispose of such material in accordance with any federal or state solid or hazardous waste law, including the Solid Waste Disposal Act (42 USC § 6901 et seq.).

12VAC5-481-980. General Provisions.

Article 12. Records

A. Licensees shall (i) use the units curie, rad, rem, and roentgen, including multiples and subdivisions, and may include the International System of Units (SI) units (Becquerel, gray, sievert, and coulomb per kilogram) and (ii) clearly indicate the units of all quantities on records required by this part.

B. Notwithstanding the requirements of subsection A of this section, when recording information on shipment manifests as required in 12VAC5-481-960 B, information shall be recorded in SI units or in SI units and units as specified in subsection A of this section.

C. The licensee shall make a clear distinction among the quantities entered on the records required by this part (e.g., total effective dose equivalent, shallow dose equivalent, lens dose equivalent, deep dose equivalent, and committed dose equivalent).

12VAC5-481-990. Records of Radiation Protection Programs.

A. Licensees shall maintain records of the radiation protection program, including:

1. The provisions of the program; and

2. Audits and other reviews of program content and implementation.

B. Licensees shall retain the records required by subdivision A 1 of this section until the agency terminates each pertinent license requiring the record. Licensees shall retain the records required by subdivision A 2 of this section for three years after the record is made.

12VAC5-481-1000. Records of Surveys.

A. Licensees shall maintain records showing the results of surveys and calibrations required by 12VAC5-481-750 and 12VAC5-481-900 B. Licensees shall retain these records for three years after the record is made.

B. Licensees shall retain each of the following records until the agency terminates each pertinent license condition requiring the record:

1. Records of the results of surveys to determine the dose from external sources and used in the absence of or in combination with individual monitoring data in the assessment of individual dose equivalents;

2. Records of the results of measurements and calculations used to determine individual intakes of radioactive material and used in the assessment of internal dose;

3. Records showing the results of air sampling, surveys, and bioassays required pursuant to 12VAC5-481-830 A 3; and

4. Records of the results of measurements and calculations used to evaluate the release of radioactive effluents to the environment.

12VAC5-481-1010. Records of Tests for Leakage or Contamination of Sealed Sources.

Records of tests for leakage or contamination of sealed sources (required by 12VAC5-481-740) shall be kept in units of becquerel or microcurie and maintained for five years after the records are made.

12VAC5-481-1020. Records of Prior Occupational Dose.

The licensee or registrant shall retain the records of prior occupational dose and exposure history as specified in 12VAC5-481-680 on an occupational radiation exposure form provided by the agency or equivalent until the agency terminates each pertinent license or registration requiring this record. The licensee or registrant shall retain records used in preparing an

occupational radiation exposure form provided by the agency or equivalent for three years after the record is made.

12VAC5-481-1030. Records of Planned Special Exposures.

A. For each use of the provisions of 12VAC5-481-690 for planned special exposures, licensees shall maintain records that describe the following:

1. The exceptional circumstances requiring the use of a planned special exposure;

2. The name of the management official who authorized the planned special exposure and a copy of the signed authorization;

3. What actions were necessary;

4. Why the actions were necessary;

5. How doses were maintained ALARA; and

6. What individual and collective doses results were expected and the doses actually received in the planned special exposure.

B. Licensees shall retain the records until the agency terminates each pertinent license requiring these records.

12VAC5-481-1040. Records of Individual Monitoring Results.

A. Licensees shall maintain records of doses received by all individuals for whom monitoring is required pursuant to 12VAC5-481-760 and records of doses received during planned special exposures, accidents, and emergency conditions. These records shall include, when applicable:

1. The deep dose equivalent to the whole body, lens deep dose equivalent, shallow dose equivalent to the skin, and shallow dose equivalent to the extremities;

2. The estimated intake of radionuclides (see 12VAC5-481-650);

3. The committed effective dose equivalent assigned to the intake of radionuclides;

4. The specific information used to assess the committed effective dose equivalent pursuant to 12VAC5-481-670 A and C and when required by 12VAC5-481-760 ;

5. The total effective dose equivalent when required by 12VAC5-481-650; and

6. The total of the deep dose equivalent and the committed dose to the organ receiving the highest total dose.

B. Licensees shall make entries of the records specified in subsection A of this section at least annually.

C. Licensees shall maintain the records specified in subsection A of this section in clear and legible records containing all the information required by 12VAC5-481-2280 .

D. The records required under this section should be protected from public disclosure because of the personal privacy nature of the records. These records are protected by privacy laws, including when the records are transferred to the agency.

E. Licensees 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.

F. Licensees shall retain the required form or record until the agency terminates each pertinent license requiring this record.

12VAC5-481-1050. Records of Dose to Individual Members of the Public.

A. Each licensee or registrant shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public per 12VAC5-481-720 .

B. The licensee or registrant shall retain the records required by subsection A of this section until the agency terminates each pertinent license or registration requiring the record.

12VAC5-481-1060. Records of Waste Disposal.

A. Each licensee or registrant shall maintain records of the disposal of licensed or registered materials made pursuant to 12VAC5-481-920 through 12VAC5-481-950 , Part XI (12VAC5-481-2330 et seq.) of this chapter, and disposal by burial in soil, including burials authorized before, September 1, 1980, of the rule that removed the authorization.

B. The licensee or registrant shall retain the records required by subsection A of this section until the agency terminates each pertinent license or registration requiring the record.

12VAC5-481-1070. Records of Testing Entry Control Devices for Very High Radiation Areas.

A. Each licensee or registrant shall maintain records of tests made on entry control devices for very high radiation areas. These records must include the date, time, and results of each such test of function.

B. The licensee or registrant shall retain the records required by subsection A of this section for three years after the record is made.

12VAC5-481-1080. Form of Records.

Each record required by Part IV (12VAC5-481-600 et seq.) of this chapter 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.

12VAC5-481-1090. Reports of Stolen, Lost, or Missing Licensed or Registered Sources of Radiation.

Article 13. Reports

A. Each licensee or registrant shall report to the agency by telephone as follows:

1. Immediately after its occurrence becomes known to the licensee, stolen, lost, or missing licensed or registered radioactive material in an aggregate quantity equal to or greater than 1,000 times the quantity specified in 12VAC5-481-3700;

2. Within 30 days after its occurrence becomes known to the licensee, lost, stolen, or missing licensed or registered radioactive material in an aggregate quantity greater than 10 times the quantity specified in 12VAC5-481-3700 that is still missing; or

3. Immediately after its occurrence becomes known to the registrant, a stolen, lost, or missing radiation machine.

B. Each licensee or registrant required to make a report pursuant to subsection A of this section shall, within 30 days after making the telephone report, make a written report to the agency setting forth the following information:

1. A description of the licensed or registered source of radiation involved, including, for radioactive material, the kind, quantity, and chemical and physical form; and, for radiation machines, the manufacturer, model and serial number, type and maximum energy of radiation emitted;

2. A description of the circumstances under which the loss or theft occurred;

3. A statement of disposition, or probable disposition, of the licensed or registered source of radiation involved;

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

5. Actions that have been taken, or will be taken, to recover the source of radiation; and

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

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

D. The licensee or registrant shall prepare any report filed with the agency pursuant to this section so that names of individuals who may have received exposure to radiation are stated in a separate and detachable portion of the report.

12VAC5-481-1100. Notification of Incidents.

A. Notwithstanding any other requirements for notification, licensees shall immediately report each event involving radioactive material possessed by the licensee that may have caused or threatens to cause any of the following conditions:

1. An individual to receive:

a. A total effective dose equivalent of 25 rem (0.25 Sv) or more;

b. A lens dose equivalent of 75 rem (0.75 Sv) or more; or

c. A shallow dose equivalent to the skin or extremities or a total organ dose equivalent of 250 rad (2.5 Gy) or more; and

2. The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake five times the occupational annual limits on intake. The provision of this subdivision does not apply to locations where personnel are not normally stationed during routine operations, such as hot cells or process enclosures.

B. Licensees shall, within 24 hours of discovery of the event, report any event involving loss of control of a licensed material possessed by the licensee that may have caused, or threatened to cause, any of the following conditions:

1. An individual to receive, in a period of 24 hours:

a. A total effective dose equivalent exceeding 5 rem (0.05 Sv);

b. A lens dose equivalent exceeding 15 rem (0.15 Sv); or

c. A shallow dose equivalent to the skin or extremities or a total organ dose equivalent exceeding 50 rem (0.5 Sv); and

2. The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake in excess of one occupational annual limits on intake. The provisions of this subdivision do not apply to locations where personnel are not normally stationed during routine operations, such as hot cells or process enclosures.

C. Licensees shall prepare any report filed with the agency pursuant to this section so that names of individuals who received exposure to radiation or radioactive material are stated in a separate and detachable part of the report.

D. Reports made by licensees in response to the requirements of this section shall be made, via telephone, to the agency at (804) 864-8150 during normal business hours and to the State Emergency Operations Center at (804) 674-1110 after normal business hours.

E. The provisions of this section do not include doses that result from planned special exposures, provided that such doses are within the limits for planned special exposures, and are reported under 12VAC5-481-1120 .

12VAC5-481-1110. Reporting Requirements.

A. Licensees shall notify the agency as soon as possible but not later than 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.). Licensees shall:

1. If required by this subsection and subsection B, notify the agency of any event, via telephone, during normal business hours to (804) 864-8150 or after hours to the State Emergency Operations Center at (804) 624-2400.

2. Submit a written report, either by mail or by hand delivery to the agency at 109 Governor Street, 7th Floor, Richmond, VA 23219.

B. Licensees shall notify the agency within 24 hours after the discovery of any of the following events involving licensed material:

1. An unplanned contamination event that:

a. 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;

b. Involves a quantity of material greater than five times the lowest annual limit on intake specified in Appendix B to 10 CFR Part 20; and

c. 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.

2. An event in which equipment is disabled or fails to function as designed when:

a. 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;

b. The equipment is required to be available and operable when it is disabled or fails to function; and

c. No redundant equipment is available and operable to perform the required safety function.

3. An event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body.

4. An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed material when:

a. The quantity of material involved is greater than five times the lowest annual limit on intake specified in Appendix B to 10 CFR Part 20; and

b. The damage affects the integrity of the licensed material or its container.

C. Notifications of any event made by licensees in response to the requirements of subsections A and B of this section shall be made to the agency, via telephone, during normal business hours to (804) 864-8150 or after hours to the State Emergency Operations Center at (804) 624-2400 and provide the following:

1. To the extent that the information is available at the time of the notification, provide a name and call back telephone number;

2. A description of the event, including date and time; if known, the sequence of occurrences leading to the event including degradation or failure of structures, systems, equipment, components; and activities of personnel relied on to prevent potential accidents;

3. The exact location of the event and whether the remaining structures, systems, equipment, components, and activities of personnel relied on to mitigate the consequences are available and reliable to perform their function;

4. Radiological or chemical hazards involved including the isotopes, quantities, and chemical and physical form of the licensed material;

5. Actual or potential health and safety consequences to the workers, the public, and the environment, including relevant chemical and any radiation data for actual personnel exposures to radiation or radioactive materials or hazardous chemicals produced from licensed material;

6. External conditions affecting the event;

7. Status of the event including actions taken by the licensee in response to the event and the current and planned site status;

8. Notification, related to the event, that were made or are planned to be made to any other local, state, or federal agencies; and

9. Status of any press releases related to the event that were made or are planned.

D. In addition to the notifications required by 12VAC5-481-1100 or subsections A and B of this section, each licensee shall submit a written report within 30 days after learning of any of the following occurrences, either by mail or by hand delivery, to the agency at 109 Governor Street, 7th Floor, Richmond, VA 23219:

1. Any incident for which notification is required by 12VAC5-481-1100 or subsections A and B of this section;

2. Doses in excess of any of the following:

a. The occupational dose limits for adults in 12VAC5-481-640;

b. The occupational dose limits for a minor in 12VAC5-481-700;

c. The limits for an embryo/fetus of a declared pregnant woman in 12VAC5-481-710;

d. The limits for an individual member of the public in 12VAC5-481-720;

e. Any applicable limits in the license; or

f. The ALARA constraints for air emissions established under 12VAC5-481-630 D;

3. Levels of radiation or concentrations of radioactive material in:

a. A restricted area in excess of any applicable limit in the license; or

b. An unrestricted area in excess of 10 times any applicable limit set forth in this part or in the license, whether or not involving exposure of any individual in excess of the limits in 12VAC5-481-720; or

4. For licensee subject to the provisions of the U.S. Environmental Protection Agency's generally applicable environmental radiation standards in 40 CFR Part 190, levels of radiation or releases of radioactive materials in excess of those standards, or of license conditions related to those standards.

E. Each report, required by subsection A of this section shall:

1. Describe the extent of exposure of individuals to radiation and radioactive material, including, as appropriate:

a. A description of the event, including the probable cause, the exact location, the isotopes and quantities, chemical and physical form of the licensed material involved, date and time of the event, and if applicable, the manufacturer and model number of any equipment that failed or malfunctioned;

b. Estimates of each individual's dose;

c. The levels of radiation and concentrations of radioactive material involved;

d. The cause of the elevated exposures, dose rates, or concentrations; and

e. Corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, ALARA constraints, generally applicable environmental standards, and associated license conditions and the results of all evaluations or assessments.

2. Include for each individual the name, social security number, and date of birth. With respect to the limit for the embryo/fetus, the identifiers should be those of the declared pregnant woman. The report shall be prepared so that this information is stated in a separate and detachable part of the report and shall be clearly labeled for protection under privacy laws.

12VAC5-481-1120. Reports of Planned Special Exposures.

The licensee or registrant shall submit a written report to the agency within 30 days following any planned special exposure conducted in accordance with 12VAC5-481-690 , informing the agency that a planned special exposure was conducted and indicating the date the planned special exposure occurred and the information required by 12VAC5-481-1030 .

12VAC5-481-1130. Reports of Individual Monitoring.

A. This section applies to each person licensed or registered by the agency to:

1. Possess or use sources of radiation for purposes of industrial radiography pursuant to Parts III (12VAC5-481-380 et seq.) and V (12VAC5-481-1170 et seq.) of this chapter; or

2. Receive radioactive waste from other persons for disposal pursuant to Part XI (12VAC5-481-2330 et seq.) of this chapter; or

3. Possess or use at any time, for processing or manufacturing for distribution pursuant to Part III (12VAC5-481-380 et seq.) or VII (12VAC5-481-1660 et seq.) of this chapter, radioactive material in quantities exceeding any one of the following quantities:

Radionuclide	Activitya GBq	Ci
Cesium-137	37	1
Cobalt-60	37	1
Gold-98	3,700	100
Iodine-131	37	1
Iridium-192	270	10
Krypton-85	37,000	1,000
Promethium-147	370	10
Technecium-99m	37,000	1,000

aThe agency may require as a license condition, or by rule, regulation, or an order pursuant to 12VAC5-481-190 , reports from licensees or registrants who are licensed or registered to use radionuclides not on this list, in quantities sufficient to cause comparable radiation levels.

B. Each licensee or registrant in a category listed in subsection A of this section shall submit an annual report of the results of individual monitoring carried out by the licensee or registrant for each individual for whom monitoring was required by 12VAC5-481-760 during that year. The licensee or registrant may include additional data for individuals for whom monitoring was provided but not required. The licensee or registrant shall use the agency's record of individual monitoring results form or equivalent or electronic media containing all the information required by the agency's record of individual monitoring results form.

C. The licensee or registrant shall file the report required by subsection B of this section, covering the preceding year, on or before April 30 of each year. The licensee or registrant shall submit the report to the agency.

12VAC5-481-1140. Notifications and Reports to Individuals.

A. Requirements for notification and reports to individuals of exposure to radiation or radioactive material are specified in 12VAC5-481-2280 .

B. When a licensee or registrant is required pursuant to 12VAC5-481-1110 to report to the agency any exposure of an individual to radiation or radioactive material, the licensee or registrant shall also notify the individual. Such notice shall be transmitted at a time not later than the transmittal to the agency, and shall comply with the provisions of 12VAC5-481-2280 A.

12VAC5-481-1150. Reports of Leaking or Contaminated Sealed Sources.

The licensee or registrant shall file a report within five days with the agency if the test for leakage or contamination required pursuant to 12VAC5-481-740 indicates a sealed source is leaking or contaminated. The report shall include the equipment involved, the test results and the corrective action taken.

12VAC5-481-1151. Reports of Transactions Involving Nationally Tracked Sources.

A. Each licensee who manufactures a nationally tracked source shall complete and submit a National Source Tracking Transaction Report. The report must include the following information:

1. The name, address, and license number of the reporting licensee;

2. The name of the individual preparing the report;

3. The manufacturer, model, and serial number of the source;

4. The radioactive material in the source;

5. The initial source strength in becquerels (curies) at the time of manufacture; and

6. The manufacture date of the source.

B. Each licensee that transfers a nationally tracked source to another person shall complete and submit a National Source Tracking Transaction Report. The report must include the following information:

1. The name, address, and license number of the reporting licensee;

2. The name of the individual preparing the report;

3. The name and license number of the recipient facility and the shipping address;

4. The manufacturer, model, and serial number of the source or, if not available, other information to uniquely identify the source;

5. The radioactive material in the source;

6. The initial or current source strength in becquerels (curies);

7. The date for which the source strength is reported;

8. The shipping date;

9. The estimated arrival date; and

10. For nationally tracked sources transferred as waste under a Uniform Low-Level Radioactive Waste Manifest, the waste manifest number and the container identification of the container with the nationally tracked source.

C. Each licensee that receives a nationally tracked source shall complete and submit a National Source Tracking Transaction Report. The report must include the following information:

1. The name, address, and license number of the reporting licensee;

2. The name of the individual preparing the report;

3. The name, address, and license number of the person that provided the source;

4. The manufacturer, model, and serial number of the source or, if not available, other information to uniquely identify the source;

5. The radioactive material in the source;

6. The initial or current source strength in becquerels (curies);

7. The date for which the source strength is reported;

8. The date of receipt; and

9. For material received under a Uniform Low-Level Radioactive Waste Manifest, the waste manifest number and the container identification with the nationally tracked source.

D. Each licensee that disassembles a nationally tracked source shall complete and submit a National Source Tracking Transaction Report. The report must include the following information:

1. The name, address, and license number of the reporting licensee;

2. The name of the individual preparing the report;

3. The manufacturer, model, and serial number of the source or, if not available, other information to uniquely identify the source;

4. The radioactive material in the source;

5. The initial or current source strength in becquerels (curies);

6. The date for which the source strength is reported; and

7. The disassemble date of the source.

E. Each licensee who disposes of a nationally tracked source shall complete and submit a

National Source Tracking Transaction Report. The report must include the following information:

1. The name, address, and license number of the reporting licensee;

2. The name of the individual preparing the report;

3. The waste manifest number;

4. The container identification with the nationally tracked source;

5. The date of disposal; and

6. The method of disposal.

F. The reports discussed in subsections A through E of this section must be submitted by the close of the next business day after the transaction. A single report may be submitted for multiple sources and transactions. The reports must be submitted to the National Source Tracking System by using:

1. The online National Source Tracking System;

2. Electronically using a computer-readable format;

3. By facsimile;

4. By mail to the address on the National Source Tracking Transaction Report Form (NRC Form 748); or

5. By telephone with followup by facsimile or mail.

G. Each licensee shall correct any error in previously filed reports or file a new report for any missed transaction within five business days of the discovery of the error or missed transaction. Such errors may be detected by a variety of methods such as administrative reviews or by physical inventories required by regulation. In addition, each licensee shall reconcile the inventory of nationally tracked sources possessed by the licensee against that licensee's data in the National Source Tracking System. The reconciliation must be conducted during the month of January in each year. The reconciliation process must include resolving any discrepancies between the National Source Tracking System and the actual inventory by filing the reports identified by subsections A through E of this section. By January 31 of each year, each licensee must submit to the National Source Tracking System confirmation that the data in the National Source Tracking System is correct.

12VAC5-481-1160. (Repealed.)

Article 14. Additional Requirements

12VAC5-481-1161. Radiological Criteria for License Termination.

A. General provisions and applicability.

1. This part applies to the decommissioning of facilities licensed under this chapter.

2. This part does not apply to sites that:

a. Have been decommissioned before the effective date as stated in 12VAC5-481-160; or

b. Have previously submitted and received NRC's approval on a license termination plan or decommissioning plan.

3. After a site has been decommissioned and the license terminated according to this section, the agency shall require additional cleanup only if, based on new information, the agency determines that the criteria of this part were not met and residual radioactivity remaining at the site could result in a significant threat to public health and safety.

4. When calculating the Total Effective Dose Equivalent (TEDE) to the average member of the critical group, the licensee shall determine the peak annual TEDE expected within the first 1,000 years after decommissioning.

B. Radiological criteria for unrestricted use. A site is 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 0.25 mSv (25 mrem) per year, including that from groundwater sources of drinking water; and the residual radioactivity has been reduced to levels that are ALARA. Determination of levels that are ALARA shall take into account consideration of any detriments, such as deaths from transportation accidents, expected to potentially result from decontamination and waste disposal.

C. Criteria for termination under restricted conditions. A site is considered acceptable for license termination under restricted conditions, if the licensee:

1. Can demonstrate that further reductions in residual radioactivity necessary to comply with subsection B of this section would result in net public or environmental harm or are not being made because the residual levels associated with restricted conditions are ALARA. Determination of the levels that are ALARA shall take into account consideration of any detriments, such as traffic accidents, expected to potentially result from decontamination and waste disposal;

2. Has made provisions for legally enforceable institutional controls that provide reasonable assurance that the TEDE from residual radioactivity, distinguishable from background radiation, will not exceed 0.25 mSv (25 mrem) per year to the average member of the critical group;

3. Has provided sufficient financial assurance to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site. Acceptable financial assurance mechanisms are:

a. Funds placed into an account segregated from the licensee's assets and outside the licensee's administrative control as described under 12VAC5-481-450 C 7 a;

b. Surety method, insurance, or other guarantee method as described under part

12VAC5-481-450 C 7 b;

c. A statement of intent, in the case of federal, state, or local government licensees, as described in 12VAC5-481-450 C 7 d; or

d. When a governmental entity is assuming custody and ownership of a site, an arrangement that is deemed acceptable by the governmental entity;

4. Has submitted a decommissioning plan or a license termination plan to the agency indicating the licensee's intent to decommission according to 12VAC5-481-510 and specifying that the licensee intends to decommission by restricting use of the site. The licensee shall document in the license termination plan or decommissioning plan how the advice of individuals and institutions in the community has been sought according to subdivisions 5 and 6 of this subsection and incorporated, as appropriate, following analysis of that advice;

5. If proposing to decommission by restricting use of the site, seeks advice from individuals and institutions in the community who may be affected by the decommissioning regarding whether:

a. Institutional controls proposed by the licensee:

(1) Will provide reasonable assurance that the TEDE from residual radioactivity distinguishable from background radiation to the average member of the critical group will not exceed 0.25 mSv (25 mrem) TEDE per year;

(2) Will be enforceable; and

(3) Will not impose undue burdens on the local community or other affected parties; and

b. The licensee has provided sufficient financial assurance to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site;

6. While seeking advice under subdivision 5 of this subsection, provides for:

a. Participation by representatives of a broad cross section of community interests who may be affected by the decommissioning;

b. An opportunity for a comprehensive, collective discussion on the issues by the participants represented; and

c. 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; and

7. Reduces residual radioactivity at the site so that if the institutional controls were no longer in effect, there is reasonable assurance that the TEDE from residual radioactivity distinguishable from background radiation to the average member of the critical group is ALARA and would not exceed:

a. 1 mSv (100 mrem) per year; or

b. 5 mSv (500 mrem) per year, if the licensee:

(1) Demonstrates that further reductions in residual radioactivity necessary to comply with subdivision C 7 a of this section are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm;

(2) Makes provisions for durable institutional controls; and

(3) Provides sufficient financial assurance, according to subdivision C 3 of this section, to enable a responsible governmental entity or independent third party, including a governmental custodian of a site, to carry out periodic rechecks of the site no less frequently than every five years to ensure that the institutional controls remain in place as necessary to meet the criteria of subdivision C 2 of this section, and to assume and carry out responsibilities for any necessary control and maintenance of those controls.

D. Alternative criteria for license termination.

1. The agency may terminate a license using alternative criteria greater than the dose criterion of subsection B and subdivision C 5 a (1) of this section, if the licensee:

a. Provides assurance that public health and safety would continue to be protected and that it is unlikely that the dose from all manmade sources combined, other than medical, would be more than the 1 mSv (100 mrem) per year limit under 12VAC5-481-720 , by submitting an analysis of possible sources of exposure;

b. Employs, to the extent practical, restrictions on site use according to subsection C of this section, in minimizing exposures at the site;

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

d. Submits a decommissioning plan or license termination plan to the agency indicating the licensee's intent to decommission according to 12VAC5-481-510 , and specifying that the licensee proposes to decommission by use of alternate criteria. The licensee shall document in the decommissioning plan or license termination 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:

(1) Participation by representatives of a broad cross section of community interests who may be affected by the decommissioning;

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

(3) 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. Has provided sufficient financial assurance in the form of a trust fund to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site.

3. The use of alternate criteria to terminate a license requires the approval of the agency after consideration of staff recommendations of the agency that address any comments provided by federal, state, and local governments and any public comments submitted pursuant under subsection E of this section.

E. Public notification and public participation. Upon receipt of a license termination plan or decommissioning plan from a licensee or a proposal by a licensee for release of a site according to subsection C or D of this section, or whenever the agency deems such notice to be in the public interest, the agency shall:

1. Notify and solicit comments from:

a. 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

b. The U.S. Environmental Protection Agency and Virginia Department of Environmental Quality for cases when the licensee proposes to release a site according to subsection D of this section; and

2. Publish a notice in the Virginia Register of Regulations and in a forum, such as local newspapers, letters to state and local organizations, or other appropriate forum, that is readily accessible to individuals in the vicinity of the site and solicit comments from affected parties.