

Standards for Protection Against Radiation

NAC 459.320 Purpose; applicability; reasonable effort required. ([NRS 459.030](#), [459.201](#))

1. The provisions of [NAC 459.320](#) to [459.374](#), inclusive, establish standards for protection against radiation hazards. It is the purpose of those sections to control the receipt, possession, use, disposal and transfer of licensed or registered sources of radiation by any licensee or registrant in such a manner that the total dose to a natural person, including exposures to licensed or unlicensed or registered or unregistered sources of radiation, whether in the possession of the licensee, registrant or any other person, but not including exposure to radiation from natural background sources, medical diagnosis and therapy, natural persons who have been administered radioactive drugs or have received permanent implants containing radioactive material and have been released from the control of a licensee pursuant to 10 C.F.R. § 35.75, or voluntary participation in medical research does not exceed the standards of radiation protection set forth in [NAC 459.320](#) to [459.374](#), inclusive. Those sections will not be construed as limiting actions that may be necessary to protect the health and safety of the public.

2. Except as otherwise specifically provided, [NAC 459.320](#) to [459.374](#), inclusive, apply to all licensees or registrants. Those sections do not limit the intentional exposure of natural persons to radiation for the purpose of medical use or the intentional exposure of natural persons to radiation who are voluntarily participating in programs for medical research.

3. In addition to complying with the requirements set forth in [NAC 459.320](#) to [459.374](#), inclusive, a licensee or registrant shall make every reasonable effort to maintain exposures and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable.

[Bd. of Health, Radiation Control Reg. §§ 4.1-4.1.2, eff. 2-28-80]—(NAC A 1-18-94; R084-98, 1-26-99; A by Dep't of Human Resources by R137-01, 5-30-2003; A by Bd. of Health by R085-06, 11-13-2006)

NAC 459.3205 Adoption by reference of certain provisions of federal regulations. ([NRS 459.201](#)) The State Board of Health hereby adopts by reference appendices A, B and C to 10 C.F.R. §§ 20.1001 to 20.2402, inclusive, as those provisions existed on October 13, 1999. A copy of the volume containing these appendices may be purchased from the Superintendent of Documents, United States Government Printing Office, P.O. Box 371954, Pittsburgh, Pennsylvania 15250-7854, for the price of \$39, or are available, free of charge, at the Internet address <http://www.gpoaccess.gov/cfr/index.html>.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; R085-06, 11-13-2006)

NAC 459.321 Development, implementation and review of program for protection against radiation; establishment of constraint on air emissions to environment of radioactive material. ([NRS 459.030](#), [459.201](#))

1. Each licensee and registrant shall:

(a) Develop, document and carry out a program for protection against radiation commensurate with the scope of its licensed or registered activities and sufficient to ensure compliance with the provisions of [NAC 459.010](#) to [459.950](#), inclusive.

(b) Use, to the extent practicable, procedures and engineering controls, based upon sound principles of protection against radiation, to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable.

(c) Review, at intervals not to exceed 12 months, the content and implementation of the program for protection against radiation.

2. A licensee or registrant shall, to achieve doses to members of the public that are as low as is reasonably achievable pursuant to paragraph (b) of subsection 1, establish a constraint on air emissions to the environment of radioactive material, excluding radon 222 and its decay products, such that the individual member of the public likely to receive the highest dose from such emissions will not be expected to receive a total effective dose equivalent in excess of 10 millirems (0.1 millisievert).

3. A licensee or registrant that causes, permits or is otherwise responsible for air emissions of radioactive material to the environment that exceed the constraint established pursuant to subsection 2 shall:

- (a) Submit to the Division the report required by [NAC 459.371](#); and
- (b) Promptly take appropriate corrective action to prevent any recurrence.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.323 Weighting factors. ([NRS 459.201](#))

1. For calculating the effective dose equivalent, the values of the weighting factor are as follows:

Organ Dose Weighting Factors

Organ or Tissue	Weighting Factor
Gonads.....	0.25
Breast.....	0.15
Red bone marrow.....	0.12
Lung.....	0.12
Thyroid.....	0.03
Bone surfaces.....	0.03
Remainder.....	0.30
Whole Body.....	1.00

2. For the purposes of weighting the remainder dose, 0.30 results from 0.06 of each of five remainder organs, excluding the skin and the lens of the eye, that receive the highest doses.

3. The use of other weighting factors for external exposure must first be approved by the Division.
(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3235 Quality factors for converting absorbed dose to dose equivalent. ([NRS 459.201](#))

1. Except as otherwise provided in subsection 2, the quality factors for converting an absorbed dose to a dose equivalent are as follows:

Quality Factors and Absorbed Dose Equivalencies

Type of Radiation	Quality Factor	Absorbed Dose Equal to a Unit Dose Equivalent
X, gamma, or beta radiation and high-speed electrons.....	1	1
Alpha particles, multiple-charged particles, fission fragments and heavy particles of unknown charge.....	20	0.05
Neutrons of unknown energy.....	10	0.1
High-energy protons.....	10	0.1

2. If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in rems per hour, as provided in subsection 1, 1 rem of neutron radiation of unknown energies may, for the purposes of [NAC 459.010](#) to [459.950](#), inclusive, be assumed to result from a total fluence of 25,000,000 neutrons per square centimeter incident upon the body. If sufficient information exists to estimate the approximate energy distribution of the neutrons, the licensee or registrant may use the fluence rate per unit dose equivalent or the appropriate quality factor value from the following table to convert a measured tissue dose in rads to dose equivalent in rem:

Mean Quality Factors and Fluence per Unit Dose
Equivalent for Monoenergetic Neutrons

Neutron Energy (MeV)	Quality Factor	Fluence per Unit Dose Equivalent (neutrons cm ² rem ⁻¹)
(thermal)		
2.5E-8	2	980E+6
1E-7	2	980E+6
1E-6	2	810E+6
1E-5	2	810E+6
1E-4	2	840E+6
1E-3	2	980E+6
1E-2	2.5	1010E+6
1E-1	7.5	170E+6
5E-1	11	39E+6
1	11	27E+6
2.5	9	29E+6
5	8	23E+6
7	7	24E+6
10	6.5	24E+6
14	7.5	17E+6
20	8	16E+6
40	7	14E+6
60	5.5	16E+6
1E+2	4	20E+6
2E+2	3.5	19E+6
3E+2	3.5	16E+6
4E+2	3.5	14E+6

3. For the purposes of subsection 2, the quality factor must be measured at the point where the dose equivalent is maximum in a 30-centimeter diameter cylinder tissue-equivalent phantom.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; R085-06, 11-13-2006)

NAC 459.325 Limits on occupational doses for adults. ([NRS 459.030](#), [459.201](#))

1. Except as otherwise provided in subsection 5, a licensee or registrant shall control occupational doses, except for planned special exposures, to ensure that no adult receives annually occupational doses in excess of the following limits:

(a) The lesser of:

(1) A total effective dose equivalent of 5 rems (50 millisieverts); or

(2) 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, of 50 rems (500 millisieverts);

(b) A lens dose equivalent of 15 rems (150 millisieverts); and

(c) A shallow-dose equivalent to the skin of the whole body or the skin of any extremity of 50 rems (500 millisieverts).

2. Occupational doses received in excess of the annual limits specified in subsection 1, including doses received during accidents, emergencies and planned special exposures, must be subtracted from the limits for planned special exposures that a person may receive during a current year and during his lifetime.

3. The assigned deep-dose equivalent must be for the portion of the body receiving the highest exposure. The assigned shallow-dose equivalent must 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 limits for occupational doses, if the personnel monitoring equipment was not in the region of highest potential exposure, or the results of personnel monitoring are unavailable.

4. The derived air concentration and annual limit on intake values that are set forth in table I of appendix B may be used to determine the occupational dose of a person and to demonstrate compliance with the limits for occupational doses.

5. Notwithstanding the annual limits, a licensee shall limit a person's intake of soluble uranium to 10 milligrams in 1 week.

6. The licensee or registrant shall reduce the occupational dose that a person is allowed to receive in a current year by the amount of the occupational dose that person received during the year while employed by another person.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by Dep't of Human Resources by R137-01, 5-30-2003; A by Bd. of Health by R085-06, 11-13-2006)

NAC 459.3255 Compliance with requirements for summation of external and internal doses. ([NRS 459.030](#), [459.201](#))

1. If a licensee is required to monitor a person pursuant to subsections 1 and 2 of [NAC 459.339](#), the licensee shall demonstrate compliance with the limits set forth in [NAC 459.325](#) by adding external and internal doses. The licensee may demonstrate compliance with the requirements for summation of external and internal doses by meeting one of the conditions specified in subsection 2 and the conditions specified in subsections 3 and 4. The lens dose equivalent and the dose equivalents for the skin and the extremities are not required to be included in the summation, but are subject to separate limits set forth in [NAC 459.325](#). If a licensee or registrant is required to monitor a person pursuant to subsection 1 of [NAC 459.339](#) only or pursuant to subsection 2 of [NAC 459.339](#) only, the summation of the doses is not required.

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

(a) The sum of the fractions of the annual limit on intake by inhalation for each radionuclide.

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

(c) The sum of the 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 subsection, an organ or tissue shall be deemed to be irradiated significantly if, for that organ or tissue, the product of the weighting factors and the committed dose equivalent, per unit intake, is greater than 10 percent of the maximum weighted value of the committed dose equivalent, per unit intake for any organ or tissue.

3. If a person who receives an occupational exposure also receives an intake of radionuclides by oral ingestion in an amount greater than 10 percent of the applicable annual limit on intake by oral ingestion, the licensee shall account for this intake and include it in demonstrating compliance with the limits set forth in [NAC 459.325](#).

4. Except as otherwise provided in this subsection, the licensee shall evaluate and, to the extent practical, account for the intake of radiation through wounds or absorption through the skin. Any intake through intact skin is not required to be evaluated or accounted for pursuant to this subsection.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.327 Determination of external dose from airborne radioactive material. ([NRS 459.030, 459.201](#))

1. Licensees shall, when determining the external dose from airborne radioactive material, include the deep-dose equivalent, lens dose equivalent and shallow-dose equivalent caused by external exposure to the cloud of airborne radioactive material.

2. Measurements of airborne radioactive material and derived air concentration must not be used as the primary means to assess the deep-dose equivalent if the airborne radioactive material includes radionuclides other than noble gases or if the cloud of airborne radioactive material is not relatively uniform. The determination of the deep-dose equivalent must be based upon measurements using instruments or personnel monitoring equipment.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.3275 Determination of compliance with limits for occupational doses. ([NRS 459.201](#))

1. For the purposes of assessing the dose used to determine compliance with the limits for occupational doses set forth in [NAC 459.325](#), a licensee shall, if required pursuant to subsection 2 of [NAC 459.339](#), take suitable and timely measurements of:

- (a) Concentrations of radioactive materials in the air in work areas;
- (b) Quantities of radionuclides in the body;
- (c) Quantities of radionuclides excreted from the body; or
- (d) Any combination of the measurements listed in paragraphs (a), (b) and (c).

2. Unless a respiratory protective device is used or the assessment of intake is based on bioassays, the licensee shall assume that a person inhales radioactive material at the airborne concentration in which the person is present.

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

- (a) Use that information to calculate the committed effective dose equivalent;
- (b) Upon prior approval of the Division, adjust the values for the derived air concentration or the annual limit on intake to reflect the actual physical and chemical characteristics of airborne radioactive material; and
- (c) Separately assess the contribution of fractional intakes of compounds of a given radionuclide in Class D, W or Y to the committed effective dose equivalent.

➔ If a licensee uses the information to calculate the committed effective dose equivalent pursuant to paragraph (a), the licensee shall document that information in the record of the person.

4. If the licensee chooses to assess intakes of material in Class Y using the measurements taken pursuant to paragraph (b) or (c) of subsection 1, the licensee may delay the recording and reporting of the assessments for not more than 7 months in order to make additional measurements basic to the assessments, unless he is otherwise required to record and report the assessments by [NAC 459.3695](#) or [459.371](#).

5. If the identity and concentration of each radionuclide in a mixture are known, the fraction of the derived air concentration applicable to the mixture that is used to calculate derived air concentration-hours must be:

- (a) The sum of the ratios of the concentration to the appropriate value for the derived air concentration from Appendix B for each radionuclide in the mixture; or
- (b) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive value for the derived air concentration for any radionuclide in the mixture.

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

7. If a mixture of radionuclides in air exists, a licensee may disregard certain radionuclides in the mixture if:

- (a) The licensee uses the total activity of the mixture in demonstrating compliance with the limits specified in [NAC 459.325](#) and in complying with the monitoring requirements specified in subsection 2 of [NAC 459.339](#);
- (b) The concentration of any radionuclide disregarded is less than 10 percent of its derived air concentration; and
- (c) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30 percent.

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

- (a) The licensee or registrant may assume that the inhalation of one annual limit on intake, or an exposure of 2,000 derived air concentration-hours, results in a committed effective dose equivalent of 5 rems for radionuclides that have their annual limits on intake or derived air concentrations based on the committed effective dose equivalent.

- (b) For an annual limit on intake and the associated derived air concentration determined by the nonstochastic organ dose limit of 50 rems, the intake of radionuclides that would result in a committed effective dose equivalent of 5 rems is listed in parentheses in Table I of Appendix B. In this case, the licensee may use the stochastic annual limit on intake to determine the committed effective dose equivalent. If the licensee uses the stochastic annual limit on intake, the licensee shall also demonstrate that the limits specified in subparagraph (2) of paragraph (a) of subsection 1 of [NAC 459.325](#) are met.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.329 Requirements for planned special exposures. ([NRS 459.201](#)) A licensee or registrant may permit a worker who is an adult to receive a planned special exposure, in addition to and accounted for separately from the doses received under the limits specified in [NAC 459.325](#), if each of the following conditions is satisfied:

1. The licensee or registrant notifies the Division of the planned special exposure in writing at least 10 working days before the planned special exposure is scheduled to occur, and verifies that the Division has received the letter of notification.

2. The planned special exposure is to occur in an exceptional situation when alternatives that might avoid the higher exposure are unavailable or impractical.

3. The licensee or registrant, and employer if the employer is not the licensee or registrant, specifically authorizes the planned special exposure, in writing, before the exposure occurs.

4. Before the planned special exposure, the licensee or registrant ensures that each person involved is:

- (a) Informed of the purpose of the planned special exposure;

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

- (c) Instructed in the measures to be taken to keep the dose as low as is reasonably achievable considering other risks that may be present.

5. Before permitting a person to participate in a planned special exposure, the licensee or registrant ascertains previous doses received by the person during his lifetime as required pursuant to [NAC 459.365](#).

6. The planned special exposure would not cause a person to receive a dose from all planned special exposures and all doses in excess of:

- (a) The numerical values of any of the limits specified in subsection 1 of [NAC 459.325](#) in any year; and

- (b) Five times the annual limits specified in subsection 1 of [NAC 459.325](#) during the lifetime of the person.

7. The licensee or registrant maintains records of the conduct of the planned special exposure in accordance with [NAC 459.3655](#) and submits a written report in accordance with [NAC 459.3715](#).

8. The licensee or registrant records the best estimate of the dose resulting from the planned special exposure in the record of the person receiving the dose and informs that person, in writing, of the dose within 30 days after the date of the planned special exposure. The dose from planned special exposures must not be

considered in controlling the future occupational dose of the person pursuant to subsection 1 of [NAC 459.325](#), but must be included in the determinations required to be made pursuant to subsections 5 and 6.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.331 Annual limits for occupational doses for minors. ([NRS 459.201](#)) The limits for the annual occupational dose for minors are 10 percent of the limits for the annual occupational dose specified in [NAC 459.325](#) for adult workers.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.333 Dose equivalents to embryos. ([NRS 459.030](#), [459.201](#))

1. Except as otherwise provided in subsection 4, a licensee or registrant shall ensure that the dose equivalent to an embryo during the entire pregnancy, resulting from occupational exposure of a woman who has declared her pregnancy, does not exceed 0.5 rem (5 millisieverts).

2. The licensee or registrant shall make efforts to avoid any substantial variation from a uniform monthly exposure rate to a woman who has declared her pregnancy so as to satisfy the limits specified in subsection 1.

3. The dose equivalent to an embryo is the sum of:

(a) The deep-dose equivalent to the woman who has declared her pregnancy; and

(b) The dose equivalent to the embryo resulting from radionuclides in the embryo and radionuclides in the woman who has declared her pregnancy.

4. If, by the time a woman declares her pregnancy to the licensee or registrant, the dose equivalent to the embryo has exceeded 0.5 rem (5 millisieverts), or is within 0.05 rem (0.5 millisievert) of that dose, the licensee or registrant shall be deemed to be in compliance with subsection 1 if the additional dose equivalent to the embryo does not exceed 0.05 rem (0.5 millisievert) during the remainder of the pregnancy.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.335 Dose limits for individual members of public; application for authorization to increase annual dose limit; imposition of additional restrictions; standards for nuclear power operations. ([NRS 459.030](#), [459.201](#))

1. Except as otherwise provided in this section and subsection 2 of [NAC 459.321](#), each licensee and registrant shall conduct operations to ensure that:

(a) The total effective dose equivalent to any member of the public from its licensed or registered operation does not exceed 0.1 rem (1 millisievert) per year, not including the dose contribution from background radiation, any medical administration the member of the public has received, exposure to natural persons who have been administered radioactive material and have been released from the control of a licensee pursuant to 10 C.F.R. § 35.75, voluntary participation in medical research, and the disposal by the licensee of radioactive material into sanitary sewerage in accordance with [NAC 459.3605](#); and

(b) The dose in any unrestricted area from external sources, not including the dose contributions from natural persons who have been administered radioactive material and have been released from the control of a licensee pursuant to 10 C.F.R. § 35.75, does not exceed 0.002 rem (0.02 millisievert) in any 1 hour.

2. Notwithstanding the provisions of paragraph (a) of subsection 1, a licensee may allow a visitor to a person who cannot be released pursuant to 10 C.F.R. § 35.75 to receive a radiation dose greater than 0.1 rem (1 millisievert) if:

(a) The radiation dose does not exceed 0.5 rem (5 millisieverts); and

(b) Before the visit, the licensee has determined that the visit is appropriate.

3. A licensee, a registrant or an applicant for a license or registration may apply to the Division for authorization to operate up to an annual dose limit for a member of the public of 0.5 rem (5 millisieverts) per year. The application must include:

(a) A demonstration of the need for and the expected duration of operations in excess of the limit specified in paragraph (a) of subsection 1;

(b) A description of the program of the licensee or registrant to assess and control the dose within the annual limit of 0.5 rem (5 millisieverts); and

(c) The procedures to be followed to maintain the dose as low as is reasonably achievable.

4. The Division 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.

5. In addition to the requirements of this section, a licensee who is subject to the provisions of 40 C.F.R. Part 190 shall comply with the standards set forth therein.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by Dep't of Human Resources by R137-01, 5-30-2003; A by Bd. of Health by R085-06, 11-13-2006)

NAC 459.3355 Compliance with dose limits for individual members of public. ([NRS 459.201](#))

1. A licensee or registrant shall make or cause to be made surveys of radiation levels in unrestricted areas and radioactive materials in effluents released to unrestricted areas in order to demonstrate compliance with the limits specified in [NAC 459.335](#) for members of the public.

2. A licensee or registrant shall demonstrate compliance with the annual limits specified in [NAC 459.335](#) by:

(a) Demonstrating by measurement or calculation that the total effective dose equivalent to the member of the public likely to receive the highest dose from the licensed or registered operation does not exceed the annual limits; or

(b) Demonstrating that:

(1) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in Table II of Appendix B; and

(2) If a person were continually present in an unrestricted area, the dose from external sources would not exceed 0.002 rem in 1 hour and 0.05 rem in 1 year.

3. Upon approval from the Division, the licensee may adjust the concentration values for effluents in Table II of Appendix B for members of the public to take into account the actual physical and chemical characteristics of the effluents.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.336 Orders requiring bioassay services. ([NRS 459.201](#)) Where necessary or desirable in order to aid in determining the extent of a person's exposure to concentrations of radioactive material, the Division may incorporate license provisions or issue an order requiring a licensee or registrant to make available to the person appropriate bioassay services and to furnish a copy of the reports of those services to the Division.

[Bd. of Health, Radiation Control Reg. § 4.2.7, eff. 2-28-80]

NAC 459.337 Surveys and monitoring. ([NRS 459.030](#), [459.201](#))

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

(a) Are necessary for the licensee or registrant to comply with [NAC 459.010](#) to [459.950](#), inclusive; and

(b) Are necessary under the circumstances to evaluate:

(1) The magnitude and extent of radiation levels;

(2) Concentrations or quantities of radioactive material; and

(3) The potential radiological hazards.

2. The licensee or registrant shall ensure that instruments and equipment used for quantitative radiation measurements are calibrated for the radiation measured at intervals not to exceed 12 months.

3. All personnel dosimeters, except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to any extremity, that require processing to determine the dose of radiation and that are used by licensees and registrants to comply with [NAC 459.325](#), with other applicable provisions of [NAC 459.010](#) to [459.950](#), inclusive, or with conditions specified in a license or registration, must be processed and evaluated by a dosimetry processor who is accredited by the National Voluntary Laboratory Accreditation Program of the National Institute of Standards and Technology for the type of radiation or radiations included in

the program that most closely approximate the type of radiation for which the person wearing the dosimeter is monitored.

4. The licensee or registrant shall ensure that adequate precautions are taken to prevent a deceptive exposure of personnel monitoring equipment.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.339 Precautionary procedures: Conditions requiring individual monitoring of external and internal occupational doses. ([NRS 459.030](#), [459.201](#)) Each licensee and registrant shall monitor exposures from sources of radiation at levels sufficient to demonstrate compliance with the limits for occupational doses specified in [NAC 459.010](#) to [459.950](#), inclusive. As a minimum:

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

(a) Adults who are likely to receive in 1 year, from sources of radiation external to the body, a dose in excess of 10 percent of the limits specified in [NAC 459.325](#);

(b) Minors who are likely to receive in 1 year, from sources of radiation external to the body, a deep-dose equivalent in excess of 0.1 rem (1 millisievert), a lens dose equivalent in excess of 0.15 rem (1.5 millisieverts), or a shallow-dose equivalent to the skin or extremities in excess of 0.5 rem (5 millisieverts);

(c) Women who have declared their pregnancy and are likely to receive, during the entire pregnancy, from sources of radiation external to the body, a deep-dose equivalent in excess of 0.1 rem (1 millisievert); and

(d) Any person entering a high or very high radiation area.

2. Each licensee shall monitor, to determine compliance with [NAC 459.3275](#), the occupational intake of radioactive material by and assess the committed effective dose equivalent to:

(a) Adults who are likely to receive, in 1 year, an intake in excess of 10 percent of the applicable annual limit on intake in columns 1 and 2 of table I of appendix B;

(b) Minors who are likely to receive, in 1 year, a committed effective dose equivalent in excess of 0.1 rem (1 millisievert); and

(c) Women who have declared their pregnancy and are likely to receive, during the entire pregnancy, a committed effective dose equivalent in excess of 0.1 rem (1 millisievert).

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.341 Precautionary procedures: Control of access to high radiation areas. ([NRS 459.201](#))

1. Except as otherwise provided in this section, a licensee or registrant shall ensure that each entrance to a high radiation area has one or more of the following features:

(a) A control device that, upon entry into the radiation area, causes the level of radiation to be reduced below the level at which a person could receive a deep-dose equivalent of 0.1 rem in 1 hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.

(b) A control device that energizes a conspicuous visible or audible alarm so that a person entering the high radiation area and the supervisor of the activity in the area are made aware of the entry.

(c) Entrances that are locked, except during periods when access to the area is required with positive control over each individual entrance.

2. In place of the controls required pursuant to subsection 1, the licensee or registrant may substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry into the radiation area.

3. The licensee or registrant may apply to the Division for authorization to use alternative methods for controlling access to high radiation areas.

4. The licensee or registrant shall establish the controls required pursuant to subsections 1 and 3 in a manner that does not prevent a person from leaving a high radiation area.

5. The licensee is not required to control each entrance to a high radiation area that contains only radioactive materials prepared for transport and packaged and labeled in accordance with the regulations of the United States Department of Transportation if:

- (a) The packages do not remain in the area for more than 3 days; and
- (b) The dose at 1 meter from the external surface of any package does not exceed 0.01 rem per hour.

6. The licensee is not required to control each entrance to a room or other area in a hospital solely because of the presence of a patient whose treatment requires the use of radioactive material if there are persons in attendance who will take the necessary precautions to:

- (a) Prevent the exposure of a person to radiation or radioactive material in excess of the limits specified in [NAC 459.325](#), [459.331](#), [459.333](#) and [459.335](#); and
 - (b) Ensure that any doses are as low as are reasonably achievable.
- (Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.343 Precautionary procedures: Control of access to very high radiation areas. ([NRS 459.201](#)) In addition to the requirements specified in [NAC 459.341](#), a licensee or registrant shall institute measures to ensure that a person is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads or more in 1 hour at 1 meter from a source of radiation or any surface through which the radiation penetrates.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.345 Precautionary procedures: Control of access to very high radiation area with sealed radioactive sources used to irradiate materials. ([NRS 459.201](#))

1. Except as otherwise provided in this section, each area in which there may exist radiation levels in excess of 500 rads in 1 hour at 1 meter from a sealed radioactive source that is used to irradiate materials must meet the following requirements:

(a) Each entrance must be equipped with entry control devices which:

- (1) Function automatically to prevent any person from inadvertently entering a very high radiation area;
- (2) Permit deliberate entry into the area only after the control device is actuated and causes the radiation level within the area, from the source of radiation, to be reduced below that at which it would be possible for a person to receive a deep-dose equivalent in excess of 0.1 rem in 1 hour; and

(3) Prevent operation of the source of radiation if it would produce radiation levels in the area that could result in a deep-dose equivalent to a person in excess of 0.1 rem in 1 hour.

(b) Additional control devices must be provided so that, upon failure of the entry control devices to function as required pursuant to paragraph (a):

(1) The radiation level within the area, from the source of radiation, is reduced below the level at which it would be possible for a person to receive a deep-dose equivalent in excess of 0.1 rem in 1 hour; and

(2) Conspicuous visible and audible alarms are generated to make any person who is attempting to enter the area aware of the hazard and to make at least one other authorized person, who is physically present, familiar with the activity and prepared to render or summon assistance, aware of the failure of the entry control devices.

(c) The licensee shall provide control devices that ensure that, upon the failure or removal of physical radiation barriers other than the shielded storage container of the sealed source:

(1) The radiation level from the source is reduced below the level at which it would be possible for a person to receive a deep-dose equivalent in excess of 0.1 rem in 1 hour; and

(2) Conspicuous visible and audible alarms are generated to make potentially affected persons aware of the hazard and to make the licensee, or at least one other person who is familiar with the activity and prepared to render or summon assistance, aware of the failure or removal of the physical barrier.

(d) When the shield for stored sealed sources is a liquid, the licensee shall provide a means to monitor the integrity of the shield and to signal, automatically, loss of adequate shielding.

(e) Physical radiation barriers that comprise permanent structural components and have no reasonable probability of failure or removal in ordinary circumstances are not required to meet the requirements of paragraph (c) or (d).

(f) Each area must be equipped with devices that will automatically generate conspicuous visible and audible alarms to alert persons in the area before the source of radiation can be put into operation and in time for any persons in the area to operate a clearly identified control device, which must be installed in the area and which is able to prevent the source of radiation from being put into operation.

(g) Each area must be controlled by the use of such administrative procedures and such devices as are necessary to ensure that the area is cleared of persons before each use of the source of radiation.

(h) Each area must be checked by a radiation measurement to ensure that, before any person enters the area after any use of the source of radiation, the radiation level from the source of radiation in the area is below the level at which it would be possible for a person to receive a deep-dose equivalent in excess of 0.1 rem in 1 hour.

(i) The entry control devices required pursuant to paragraph (a) must be tested for proper functioning in the following manner:

(1) Testing must be conducted before the initial operation of the source of radiation on any day, unless operations were continued uninterrupted from the previous day;

(2) Testing must be conducted before the resumption of operation of the source of radiation after any unintentional interruption; and

(3) The licensee shall submit and adhere to a schedule for periodic tests of the entry control devices and warning systems.

(j) The licensee shall not conduct operations, other than those necessary to place the source of radiation in safe condition or to effect repairs on control devices, unless control devices are functioning properly.

(k) Entry and exit portals that are used in transporting materials to and from the area and that are not intended for use by persons to enter or exit the area, must be controlled by such devices and administrative procedures as are necessary to protect and warn against inadvertent entry by any person through these portals. Exit portals which are for irradiated materials must be equipped to detect and signal the presence of any loose radioactive material that is carried toward such a portal and automatically to prevent loose radioactive material from being carried out of the area.

2. Licensees or applicants for licenses who are subject to the provisions of subsection 1 and will use the source of radiation in a variety of positions or in locations which make it impracticable to comply with the requirements of subsection 1, may apply to the Division for approval of alternative safety measures. Alternative safety measures must provide persons with protection that is at least equivalent to the protection specified in subsection 1. At least one of the alternative measures must include an inter-lock control device that is designed to prevent entry based on a measurement of the radiation and that ensures the absence of high radiation levels before a person can gain access to the area where such sources of radiation are used.

3. The entry control devices required by subsections 1 and 2 must be established in such a manner that no person will be prevented from leaving the area.

4. As used in this section, sealed radioactive source means any by-product, source or special nuclear material that is used in sealed sources in irradiators that are not self-shielded.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.347 Precautionary procedures: Use of process or other engineering controls; alternative controls; consideration of other safety factors. ([NRS 459.201](#))

1. A licensee shall use, to the extent practicable, process or other engineering controls, including, without limitation, containment, decontamination and ventilation, to control the concentrations of radioactive material in the air.

2. If it is not practicable to apply process or other engineering controls to control the concentrations of radioactive material in the air to levels below those that define an area of airborne radioactivity, the licensee shall, consistent with maintaining the total effective dose equivalent as low as is reasonably achievable, increase monitoring and limit intakes by one or more of the following:

- (a) Controlling access to the area;
- (b) Limiting exposure times;
- (c) Using respiratory protective devices; or
- (d) Using any other means available to control concentrations of radioactive material in the air.

3. If the licensee performs an analysis of exposures to radiation to determine what exposure level is as low as is reasonably achievable and to determine whether respiratory protective devices should be used, the licensee may consider safety factors other than radiological safety factors, including, without limitation, consideration of the effect of respiratory protective devices on the industrial health and safety of workers.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R085-06, 11-13-2006)

NAC 459.349 Precautionary procedures: Use of respiratory protective devices. ([NRS 459.201](#))

1. If a licensee uses respiratory protective devices to limit intakes as required pursuant to [NAC 459.347](#), the licensee shall comply with the following requirements:

(a) Except as otherwise provided in paragraph (b), the licensee shall use only a respiratory protective device that is tested and certified, or has had certification extended, by the National Institute for Occupational Safety and Health.

(b) If the licensee wishes to use equipment that has not been tested or certified by the National Institute for Occupational Safety and Health, or for which there is no schedule for testing or certification, the licensee shall submit an application for authorized use of that equipment. The application must 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. The evidence must be acquired from tests performed on the equipment by the licensee or based on information obtained from other reliable tests that have been performed on the equipment.

(c) The licensee shall implement and maintain a program for respiratory protection that includes, without limitation:

(1) A sampling of the air that is sufficient to identify any potential hazard, permit the proper selection of equipment and estimate doses;

(2) Surveys and bioassays, as necessary, to evaluate actual intakes;

(3) Testing respiratory protective devices for operability immediately before each use, including, without limitation, user-performed seal checks for face-sealing respirators and functional checks for all other respirators;

(4) Written procedures regarding:

(I) Testing, including, without limitation, fit testing;

(II) The supervision and training of users of respiratory protective devices;

(III) Recordkeeping;

(IV) Monitoring, including, without limitation, sampling air and bioassays;

(V) Selection of respiratory protective devices;

(VI) Breathing air quality;

(VII) Inventory and control of respiratory protective devices;

(VIII) Storage, issuance, maintenance, repair and quality assurance of respiratory protective devices;

and

(IX) Limitations on periods of use of respiratory protective devices and relief from use of respiratory protective devices; and

(5) The determination by a physician that each user of a face-sealing respirator or nonface-sealing respirator is medically fit to use the respirator before the initial fitting of a face-sealing respirator or before the first use of a nonface-sealing respirator and:

(I) At least once every 12 months after the initial fitting; or

(II) Periodically at a frequency that is determined by the physician.

(d) The licensee shall perform fit testing for a respirator before the first field use of a respirator with a tight-fitting facepiece and not less than annually thereafter. The fit test must be performed with the facepiece of the respirator operating in the negative pressure mode and the fit factor:

- (1) For a negative pressure respirator must be greater than or equal to 10 times the air pressure flow; and
 - (2) For a positive pressure, continuous flow or pressure demand respirator must exceed 500.
- (e) The licensee shall advise each user of a respiratory protective device that the user may leave the area at any time for relief from the use of the respiratory protective device if:
- (1) The device malfunctions;
 - (2) He suffers physical or psychological distress;
 - (3) There is a failure of communication or procedures;
 - (4) There is a significant deterioration in the operating conditions; or
 - (5) There are any other conditions that might require relief from use of the device.
- (f) The licensee shall:
- (1) Consider limitations appropriate to the type of respiratory protective device and the intended mode of use of the respiratory protective device;
 - (2) When selecting a respiratory protective device, provide for vision correction, adequate communication, low-temperature work environments and the concurrent use of other safety and radiological protection equipment; and
 - (3) Use equipment in a manner that does not interfere with the proper operation of the respiratory protective device.
- (g) The licensee shall provide standby rescue personnel when a person is using a one-piece atmosphere-supplying suit or any combination of a supplied-air respirator and personnel protective equipment from which the person would have difficulty extricating himself. The standby rescue personnel must:
- (1) Be equipped with respiratory protective devices or other equipment appropriate to the potential hazards.
 - (2) Visually observe the person who is using a one-piece atmosphere-supplying suit or any combination of a supplied-air respirator and personnel protective equipment or maintain continuous communication with such person through visual, voice, signal line, telephone, radio or other suitable means of communication.
 - (3) Be immediately available to assist the person who is using a one-piece atmosphere-supplying suit or any combination of a supplied-air respirator and personnel protective equipment in case of a failure of air supply or for any other reason that requires relief from distress.
 - (4) Be sufficient in number and training to provide immediate assistance to the person who is using a one-piece atmosphere-supplying suit or any combination of a supplied-air respirator and personnel protective equipment and to provide effective emergency rescue if needed.
- (h) The licensee shall ensure that atmosphere-supplying respirators are supplied with desirable air of grade D quality or better as defined in Publication G-7.1, *Commodity Specification for Air* (1997), and the provisions of 29 C.F.R. §§ 1910.134(i)(1)(ii)(A) to 1910.134(i)(1)(ii)(E), inclusive. A hard copy of Publication G-7.1, *Commodity Specification for Air* (1997), published by the Compressed Gas Association, may be obtained at a cost of \$32 for a member of the Compressed Gas Association or \$58 for a nonmember at the Internet address <http://www.cganet.com/publication.asp>. An electronic copy of the publication may be obtained free of charge for a member of the Compressed Gas Association or at a cost of \$44 for a nonmember at the Internet address <http://www.cganet.com/publication.asp>.
- (i) The licensee shall ensure that no objects, materials or substances, including, without limitation, facial hair, or any conditions which could interfere with the face-to-facepiece seal or valve function and which are under the control of the user of the respirator are present between the skin of the face of the user of the respirator and the sealing surface of a tight-fitting facepiece.
- (j) In measuring the dose to persons from the intake of airborne radioactive material, the licensee must assume initially that the concentration of radioactive material in the air that is inhaled when a respirator is worn is the ambient concentration of radioactive material in the air without a respirator divided by the assigned protection factor of the respirator. If the licensee later finds that the actual dose is greater than the estimated dose, the actual dose must be used. If the actual dose is later found to be less than the estimated dose, the actual dose may be used.

2. A licensee shall obtain authorization from the Division before using assigned respiratory protection factors in excess of those specified in Appendix A. The Division may authorize a licensee to use higher assigned protection factors upon receipt of an application that:

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

(b) Demonstrates that the respiratory protective device provides these higher protection factors under the proposed conditions of use.

3. In addition to any restrictions imposed pursuant to the provisions of this section and [NAC 459.347](#), the Division may impose restrictions on the use of respiratory protective devices by a licensee to:

(a) Ensure that the respiratory protection program of the licensee is adequate to limit doses to persons from the intake of airborne radioactive material consistent with maintaining the total effective dose equivalent as low as is reasonably achievable; and

(b) Limit the extent to which a licensee may use respiratory protective devices instead of processes or engineering controls to limit doses to persons from the intake of airborne radioactive material.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; A by R085-06, 11-13-2006)

NAC 459.352 Precautionary procedures: Radiation machines. ([NRS 459.201](#)) All radiation machines must be labeled in a manner which cautions people that radiation is produced when the machine is being operated.

[Bd. of Health, Radiation Control Reg. § 4.3.3.7, eff. 2-28-80]

NAC 459.3525 Precautionary procedures: Control of licensed radioactive material and radiation machines in unrestricted areas and not in storage. ([NRS 459.201](#))

1. A licensee shall control and maintain constant surveillance of licensed radioactive material that is in an unrestricted area and that is not in storage or related to the care of a patient.

2. A registrant shall maintain control of radiation machines that are in an unrestricted area and that are not in storage.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.353 Precautionary procedures: Security of stored material. ([NRS 459.201](#)) A licensee or registrant shall secure from unauthorized removal or access licensed or registered sources of radiation that are stored in unrestricted areas.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.354 Precautionary procedures: Instruction of personnel. ([NRS 459.201](#)) Instructions are required for persons working in or frequenting any portion of a restricted area as specified in [NAC 459.784](#).

[Bd. of Health, Radiation Control Reg. § 4.3.5, eff. 2-28-80]

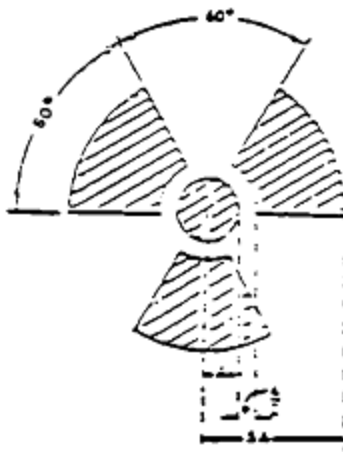
NAC 459.355 Precautionary procedures: Radiation symbol; labels; additional information. ([NRS 459.201](#))

1. Except as otherwise provided in this section or as otherwise authorized by the Division, a licensee or registrant shall use a radiation symbol with a three-bladed design as follows:

(a) Each cross-hatched area must be magenta, purple or black; and

(b) The background must be yellow.

Radiation symbol



2. A licensee may label sources of radiation, holders for sources of radiation or device components containing sources of radiation that are subjected to high temperatures, with conspicuously etched or stamped radiation symbols that do not comply with the requirements for color set forth in subsection 1.

3. In addition to the contents of signs and labels required by [NAC 459.010](#) to [459.950](#), inclusive, a licensee or registrant shall provide, on or near the required signs and labels, additional information, as appropriate, to make persons aware of potential exposures and to minimize those exposures.

4. A radiation symbol or the labels described in [NAC 459.010](#) to [459.950](#), inclusive, must only be used when conditions exist that warrant their use.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.3555 Precautionary procedures: Requirements for posting signs. ([NRS 459.201](#)) Except as otherwise provided in [NAC 459.3565](#):

1. A licensee or registrant shall post in each radiation area a conspicuous sign or signs bearing the radiation symbol and the words “CAUTION, RADIATION AREA.”

2. A licensee or registrant shall post in each high radiation area a conspicuous sign or signs bearing the radiation symbol and the words “CAUTION, HIGH RADIATION AREA” or “DANGER, HIGH RADIATION AREA.”

3. A licensee or registrant shall post in each very high radiation area a conspicuous sign or signs bearing the radiation symbol and the words “GRAVE DANGER, VERY HIGH RADIATION AREA.”

4. A licensee shall post in each area of airborne radioactivity a conspicuous sign or signs bearing the radiation symbol and the words “CAUTION, AIRBORNE RADIOACTIVITY AREA” or “DANGER, AIRBORNE RADIOACTIVITY AREA.”

5. A licensee shall post in each area or room in which there is used or stored an amount of licensed radioactive material exceeding 10 times the quantity of such material specified in Appendix C a conspicuous sign or signs bearing the radiation symbol and the words “CAUTION, RADIOACTIVE MATERIAL(S)” or “DANGER, RADIOACTIVE MATERIAL(S).”

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3565 Precautionary procedures: Exceptions to requirements for posting signs. ([NRS 459.030](#), [459.201](#))

1. A licensee or registrant is not required to post signs pursuant to [NAC 459.3555](#) in an area or room containing sources of radiation for periods of less than 8 hours if:

(a) The sources of radiation are constantly attended during these periods by a person who takes the precautions necessary to prevent the exposure of persons to sources of radiation in excess of the limits established in [NAC 459.325](#), [459.331](#), [459.333](#) and [459.335](#); and

(b) The area or room is subject to the control of the licensee or registrant.

2. A room or other area in a hospital that is occupied by a patient is not required to be posted with signs pursuant to [NAC 459.3555](#) if:

(a) The patient is being treated with sealed sources of radiation or has been treated with unsealed radioactive material in quantities of less than 30 millicuries (1.11 gigabecquerels), or the measured dose rate at 1 meter from the patient is less than 0.005 rem (0.05 millisievert) per hour;

(b) The licensee is authorized to release the patient from confinement pursuant to 10 C.F.R. § 35.75; and

(c) There are personnel in attendance who will take the necessary precautions to prevent the exposure of persons to radiation or radioactive materials in excess of the limits specified in [NAC 459.325](#), [459.331](#), [459.333](#) and [459.335](#), and to maintain the level of radiation at a level which is as low as is reasonably achievable.

3. A room or area is not required to be posted with signs pursuant to [NAC 459.3555](#) because of the presence of a sealed source of radiation if the level of radiation at 30 centimeters from the surface of the container or housing for the sealed source does not exceed 0.005 rem (0.05 millisievert) per hour.

4. A room in a hospital or clinic that is used for teletherapy is not required to be posted with signs pursuant to [NAC 459.3555](#) if there are personnel in attendance who will take the necessary precautions to prevent the exposure of any person to radiation or radioactive materials in excess of the limits established in [NAC 459.325](#), [459.331](#), [459.333](#) and [459.335](#), and to maintain the level of radiation at a level that is as low as is reasonably achievable.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by Dep't of Human Resources by R137-01, 5-30-2003; A by Bd. of Health by R085-06, 11-13-2006)

NAC 459.357 Precautionary procedures: Requirements for labeling containers and radiation machines. ([NRS 459.201](#)) Except as otherwise provided in [NAC 459.3575](#):

1. Each licensee shall ensure that each container of licensed radioactive material bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The label must provide information to permit persons handling or using the container, or working in the vicinity of the container, to take precautions to avoid or minimize exposures. The information on the label may include, but is not limited to:

(a) The radionuclides present;

(b) An estimate of the quantity of radioactivity;

(c) The date for which the activity is estimated;

(d) The levels of radiation;

(e) The kinds of radioactive materials present; and

(f) The mass enrichment.

2. Each licensee shall, before the removal or disposal of empty uncontaminated containers in unrestricted areas, remove or deface the label required pursuant to subsection 1, or otherwise clearly indicate that the container no longer contains radioactive material.

3. Each registrant shall ensure that each radiation machine is labeled in a conspicuous manner which cautions persons that radiation is produced when the machine is energized.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3575 Precautionary procedures: Exceptions to requirements for labeling containers. ([NRS 459.201](#)) A licensee is not required to label a container pursuant to [NAC 459.357](#) if the container is:

1. Holding licensed radioactive material in quantities that are less than the quantities listed in Appendix C.

2. Holding licensed radioactive material in concentrations that are less than those specified in Table III of Appendix B.

3. Attended by a person who takes the precautions necessary to prevent the exposure of persons in excess of the limits established by [NAC 459.010](#) to [459.950](#), inclusive.

4. In transport and is packaged and labeled in accordance with the regulations of the United States Department of Transportation.

5. Accessible only to persons authorized to work in the vicinity of the container or authorized to handle or use the container, if the contents of the container are identified to those persons by a readily available written record which is retained while the container is in use for the purpose indicated on the record.

6. Installed manufacturing or process equipment.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.3585 Precautionary procedures: Receiving, monitoring and opening packages. ([NRS 459.201](#))

1. Each licensee who expects to receive a package containing quantities of radioactive material in excess of a type A quantity, as defined in 10 C.F.R. § 71.4, as that section existed on January 1, 1993, shall make arrangements to receive:

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

(b) Notification of the arrival of the package at the terminal of the carrier and to take possession of the package expeditiously.

2. Except as otherwise provided in subsection 6, each licensee shall monitor the external surfaces of a package known to contain radioactive material for radioactive contamination and radiation levels if the package:

(a) Is labeled as containing radioactive material; or

(b) Has evidence of potential contamination.

3. The licensee shall perform the monitoring required pursuant to subsection 2 as soon as practicable after receipt of the package, but not later than 3 hours after the package is received at the facility of the licensee if the package is received during the normal working hours of the licensee. If the package is received after the normal working hours of the licensee, the monitoring must be performed not later than 3 hours after the beginning of the next normal working day of the licensee.

4. A licensee shall immediately notify the carrier who made the final delivery of a package and, by telephone and telegram, mailgram or facsimile, the Division, if:

(a) Removable radioactive contamination on the surface of the package is detected that exceeds 22,000 disintegrations per minute per 100 square centimeters of package surface; or

(b) The radiation level at 1 meter from the surface of the package exceeds 10 milliroentgens per hour.

5. Each licensee shall:

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

(b) Ensure that the procedures established pursuant to paragraph (a) are followed and that consideration is given to any special instructions for the type of package being opened.

6. A licensee transferring a source of radiation in a special form in a motor vehicle owned or operated by the licensee to and from a work site is not required to comply with the requirements of subsection 2, but shall ensure that the source of radiation is still properly lodged in its shield.

7. For the purposes of this section, the State Board of Health hereby adopts by reference 10 C.F.R. § 71.4, as that section existed on January 1, 1993. A copy of the volume containing that section may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, for the price of \$21.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.359 Disposal of waste: General requirements. ([NRS 459.201](#))

1. A licensee shall dispose of licensed radioactive material only:

(a) By transfer to an authorized recipient as provided in [NAC 459.180](#) to [459.314](#), inclusive, and [459.8231](#) to [459.950](#), inclusive;

(b) By decay in storage;

(c) By release in effluents within the limits specified in [NAC 459.335](#); or

(d) As authorized pursuant to [NAC 459.3595](#) to [459.3615](#), inclusive.

2. A person must be licensed by the Division to receive waste containing licensed radioactive material from other persons for:

- (a) Treatment before disposal;
 - (b) Treatment or disposal by incineration;
 - (c) Decay in storage;
 - (d) Disposal at a land disposal facility licensed pursuant to [NAC 459.806](#) to [459.8225](#), inclusive; or
 - (e) Storage until it is transferred to a storage or disposal facility authorized to receive the waste.
- (Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.3595 Disposal of waste: Application for approval of proposed procedures. ([NRS 459.201](#)) A licensee or applicant for a license may apply to the Division for approval of proposed procedures, not otherwise authorized pursuant to [NAC 459.010](#) to [459.950](#), inclusive, to dispose of licensed radioactive material generated in the operations of the licensee. Each application must include:

1. A description of the waste containing the licensed radioactive material to be disposed of, including, without limitation, the physical and chemical properties that have an impact on evaluating the risk of the proposed procedures, and the proposed manner and conditions of disposing of the waste;
 2. An analysis and evaluation of pertinent information related to the impact of the proposed procedures on the environment;
 3. The nature and location of other potentially affected facilities; and
 4. Analyses and procedures to ensure that doses are maintained as low as are reasonably achievable and within the limits specified in [NAC 459.325](#), [459.331](#), [459.333](#) and [459.335](#).
- (Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.3605 Disposal of waste: Release into sanitary sewerage. ([NRS 459.201](#))

1. Except as otherwise provided in subsection 2, a licensee may discharge licensed radioactive material into sanitary sewerage only if each of the following conditions is satisfied:
 - (a) The material is readily soluble in water or is readily dispersible biological material in water.
 - (b) The quantity of all radioactive material that the licensee releases into the sanitary sewerage in 1 month divided by the average monthly volume of water released into the sanitary sewerage by the licensee does not exceed the concentration of radioactive material listed in Table III of Appendix B.
 - (c) The total quantity of all radioactive material that the licensee releases into the sanitary sewerage in 1 year does not exceed 5 curies of hydrogen-3, 1 curie of carbon-14 and 1 curie of all other radioactive materials combined.
 - (d) If more than one radionuclide is released:
 - (1) The licensee determines the fraction of the limits in Table III of Appendix B represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sanitary sewerage by the concentration of that radionuclide listed in Table III of Appendix B; and
 - (2) The sum of the fractions for each radionuclide required by subparagraph (1) does not exceed unity.
 2. Excreta from persons undergoing medical diagnosis or therapy with radioactive material is not subject to the limitations contained in subsection 1.
- (Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.361 Disposal of waste: Treatment or disposal by incineration. ([NRS 459.201](#)) A licensee may treat or dispose of licensed radioactive material by incineration only in the amounts and forms:

1. Specified in [NAC 459.3615](#); or
 2. Approved by the Division pursuant to [NAC 459.3595](#).
- (Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3615 Disposal of waste: Specific wastes. ([NRS 459.201](#))

1. Except as otherwise provided in subsection 2, a licensee may dispose of the following licensed radioactive material as if it were not radioactive:

(a) Not more than 0.05 microcurie of hydrogen-3 or carbon-14 per gram of medium used for liquid scintillation counting; and

(b) Not more than 0.05 microcurie of hydrogen-3 or carbon-14 per gram of animal tissue, averaged over the weight of the entire animal.

2. A licensee shall not dispose of tissue under paragraph (b) of subsection 1 in a manner that would permit its use either as food for humans or as feed for animals.

3. The licensee shall maintain records of the disposal of radioactive material described in this section until the Division terminates his license.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.362 Quantities of radioactive materials for signs, labels and signals; disposal of waste. ([NRS 459.201](#)) The following quantities must be used for the purposes of subsection 1 of [NAC 459.1955](#):

Radioactive material	Microcuries
Americium 241	0.01
Antimony 122	100
Antimony 124	10
Antimony 125	10
Arsenic 73	100
Arsenic 74	10
Arsenic 76	10
Arsenic 77	100
Barium 131	10
Barium 133	10
Barium 140	10
Bismuth 210	1
Bromine 82	10
Cadmium 109	10
Cadmium 115m	10
Cadmium 115	100
Calcium 45	10
Calcium 47	10
Carbon 14	100
Cerium 141	100
Cerium 143	100
Cerium 144	1
Cesium 131	1,000
Cesium 134m	100
Cesium 134	1
Cesium 135	10
Cesium 136	10
Cesium 137	10
Chlorine 36	10
Chlorine 38	10
Chromium 51	1,000
Cobalt 58m	10
Cobalt 58	10

Radioactive material	Microcuries
Cobalt 60	1
Copper 64	100
Dysprosium 165	10
Dysprosium 166	100
Erbium 169	100
Erbium 171	100
Europium 152 (9.2 h)	100
Europium 152 (13 yr)	1
Europium 154	1
Europium 155	10
Fluorine 18	1,000
Gadolinium 153	10
Gadolinium 159	100
Gallium 72	10
Germanium 71	100
Gold 198	100
Gold 199	100
Hafnium 181	10
Holmium 166	100
Hydrogen 3	1,000
Indium 113m	100
Indium 114m	10
Indium 115m	100
Indium 115	10
Iodine 125	1
Iodine 126	1
Iodine 129	0.1
Iodine 131	1
Iodine 132	10
Iodine 133	1
Iodine 134	10
Iodine 135	10
Iridium 192	10
Iridium 194	100
Iron 55	100
Iron 59	10
Krypton 85	100
Krypton 87	10
Lanthanum 140	10
Lutetium 177	100
Manganese 52	10
Manganese 54	10
Manganese 56	10
Mercury 197m	100
Mercury 197	100
Mercury 203	10
Molybdenum 99	100
Neodymium 147	100
Neodymium 149	100

Radioactive material	Microcuries
Nickel 59	100
Nickel 63	10
Nickel 65	100
Niobium 93m	10
Niobium 95	10
Niobium 97	10
Osmium 185	10
Osmium 191m	100
Osmium 191	100
Osmium 193	100
Palladium 103	100
Palladium 109	100
Phosphorus 32	10
Platinum 191	100
Platinum 193m	100
Platinum 193	100
Platinum 197m	100
Platinum 197	100
Plutonium 239	0.01
Polonium 210	0.1
Potassium 42	10
Praseodymium 142	100
Praseodymium 143	100
Promethium 147	10
Promethium 149	10
Radium 226	0.01
Rhenium 186	100
Rhenium 188	100
Rhodium 103m	100
Rhodium 105	100
Rubidium 86	10
Rubidium 87	10
Ruthenium 97	100
Ruthenium 103	10
Ruthenium 105	10
Ruthenium 106	1
Samarium 151	10
Samarium 153	100
Scandium 46	10
Scandium 47	100
Scandium 48	10
Selenium 75	10
Silicon 31	100
Silver 105	10
Silver 110m	1
Silver 111	100
Sodium 24	10
Strontium 85	10
Strontium 89	1

Radioactive material	Microcuries
Strontium 90	0.1
Strontium 91	10
Strontium 92	10
Sulphur 35	100
Tantalum 182	10
Technetium 96	10
Technetium 97m	100
Technetium 97	100
Technetium 99m	100
Technetium 99	10
Tellurium 125m	10
Tellurium 127m	10
Tellurium 127	100
Tellurium 129m	10
Tellurium 129	100
Tellurium 131m	10
Tellurium 132	10
Terbium 160	10
Thallium 200	100
Thallium 201	100
Thallium 202	100
Thallium 204	10
Thorium (natural) ¹	100
Thulium 170	10
Thulium 171	10
Tin 113	10
Tin 125	10
Tungsten 181	10
Tungsten 185	10
Tungsten 187	100
Uranium (natural) ²	100
Uranium 233	0.01
Uranium 234	0.01
Uranium 235	0.01
Vanadium 48	10
Xenon 131m	1,000
Xenon 133	100
Xenon 135	100
Ytterbium 175	100
Yttrium 90	10
Yttrium 91	10
Yttrium 92	100
Yttrium 93	100
Zinc 65	10
Zinc 69m	100
Zinc 69	1,000
Zirconium 93	10
Zirconium 95	10
Zirconium 97	10

Radioactive material	Microcuries
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Any alpha emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition.	0.01
Any radionuclide other than alpha emitting radionuclides, not listed above or mixtures of beta emitters of unknown composition.	0.1

¹ Based on alpha disintegration rate of Th 232, Th 230, and their daughter products.

² Based on alpha disintegration rate of U 238, U 234, and U 235.

[Bd. of Health, Radiation Control Reg. Art. 4, Appendix B, eff. 2-28-80]—(NAC A 1-18-94)

NAC 459.3625 General requirements for preparation and retention of records. ([NRS 459.030, 459.201](#))

1. Except as otherwise provided in subsection 5, each licensee and registrant shall use the units curie, rad, rem and roentgen, including multiples and subdivisions thereof, to prepare the records required by [NAC 459.010](#) to [459.950](#), inclusive, and shall clearly indicate the units of all quantities entered on those records.

2. The licensee or registrant shall make a clear distinction among the quantities entered on the records required by [NAC 459.010](#) to [459.950](#), inclusive, including, without limitation:

- (a) Committed effective dose equivalent;
- (b) Deep-dose equivalent;
- (c) Lens dose equivalent;
- (d) Shallow-dose equivalent; and
- (e) Total effective dose equivalent.

3. The licensee may record, in parentheses following the unit measurements required pursuant to subsection 1, the equivalent quantities expressed as unit measurements pursuant to the International System of Units (SI).

4. A discontinuance or curtailment of the activities of a licensee or registrant does not relieve that licensee or registrant of the responsibility for retaining all records required by [NAC 459.010](#) to [459.950](#), inclusive. A licensee or registrant may request the Division to retain such records. An acceptance of the records by the Division relieves the licensee or registrant of subsequent responsibility only in respect to their retention as required by this section.

5. Each licensee or registrant shall use to prepare shipment manifests required pursuant to [NAC 459.8231](#):

- (a) The International System of Units (SI); or
- (b) The International System of Units (SI) and the units set forth in subsection 1.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.363 Authorized forms of records for purposes of legibility; safeguards. ([NRS 459.201](#))

1. Each record required by [NAC 459.010](#) to [459.950](#), inclusive, must be legible throughout the specified period of retention. The record must be:

- (a) The original;
- (b) A reproduced copy or a microform, if the copy or microform is authenticated by authorized personnel and, if microform is used, the microform is capable of producing a clear copy throughout the specified period of retention; or

(c) Stored in electronic media with the capability for producing legible, accurate and complete records during the specified period of retention.

2. A licensee or registrant shall maintain adequate safeguards to prevent tampering with and the loss of records.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.3635 Records of program for protection against radiation. ([NRS 459.201](#))

1. Each licensee and registrant shall maintain records of its program for protection against radiation required pursuant to [NAC 459.321](#), including:

(a) The provisions of the program; and

(b) The results of audits and other reviews of the content and implementation of the program.

2. The licensee or registrant shall retain the records required by paragraph (a) of subsection 1 until the Division terminates each license or registration requiring the record. The licensee or registrant shall retain each record required by paragraph (b) of subsection 1 for at least 3 years after the record is made.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3645 Records of surveys and calibrations. ([NRS 459.201](#))

1. Each licensee and registrant shall maintain records showing the results of surveys and calibrations required pursuant to [NAC 459.337](#) and [459.3585](#). The licensee or registrant shall retain each such record for at least 3 years after the record is made.

2. A licensee or registrant shall retain each of the following records until the Division authorizes their disposal:

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

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

(c) Records showing the results of sampling air and surveys and bioassays required pursuant to subparagraphs (1) and (2) of paragraph (c) of subsection 1 of [NAC 459.349](#); and

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

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.365 Records of prior occupational doses. ([NRS 459.201](#))

1. For each person who is likely to receive, in 1 year, an occupational dose requiring monitoring pursuant to [NAC 459.339](#), the licensee or registrant shall:

(a) Determine the occupational dose received by that person during the current year; and

(b) Attempt to obtain the records of the lifetime cumulative occupational dose received by that person.

2. Before permitting a person to participate in a planned special exposure, the licensee or registrant shall determine:

(a) The internal and external doses received by that person from all previous planned special exposures;

(b) All doses in excess of the limits, including, without limitation, doses received during accidents and emergencies, received during the lifetime of the person; and

(c) All lifetime cumulative occupational doses.

3. To comply with the requirements of subsection 1, a licensee or registrant may:

(a) Accept, as a record of the occupational dose that the person received during the current year, a signed written statement from the person, or from his most recent employer for work involving exposure to radiation, that discloses the nature and the amount of any occupational dose that the person received during the current year.

(b) Accept, as the record of the lifetime cumulative dose received by a person, a current form regarding history of cumulative occupational exposure, signed by the person and countersigned by:

(1) An appropriate official of the most recent employer of the person for work involving exposure to radiation; or

(2) The current employer of the person, if the person is not employed by the licensee or registrant.

(c) Obtain reports regarding the dose equivalent of a person from his most recent employer for work involving exposure to radiation, or the current employer of the person if he is not employed by the licensee or registrant, by telephone, telegram, facsimile, electronic media or letter. The licensee or registrant shall request a written verification of the data if the authenticity of the transmitted report cannot be established.

4. A licensee or registrant shall record the history of exposure of each person, as required by subsection 1, on a form regarding history of cumulative occupational exposure, and shall include all the information required by that form. The form must show each period in which the person received occupational exposure to radiation or radioactive material and must be signed by that person. For each period for which the licensee or registrant obtains a report, the licensee or registrant shall use the dose shown in the report in preparing the form regarding history of cumulative occupational exposure. For any period in which the licensee or registrant does not obtain a report, the licensee or registrant shall place a notation on the form regarding history of cumulative occupational exposure indicating the periods for which data is not available.

5. Licensees and registrants are not required to reevaluate the separate dose equivalents received from sources of radiation outside the body and committed dose equivalents or intakes of radionuclides received from radioactive material taken into the body that are assessed before January 18, 1994. Histories of occupational exposure obtained and recorded on the form regarding history of cumulative occupational exposure before January 18, 1994, may be used in the absence of specific information regarding the intake of radionuclides by the person.

6. If the licensee or registrant is unable to obtain a complete record of the current and previously accumulated occupational dose of a person, the licensee or registrant shall:

(a) In establishing administrative controls pursuant to subsection 6 of [NAC 459.325](#) for the current year, assume that the allowable limits for the person are reduced by 1.25 rems for each quarter for which records were unavailable and the person was engaged in activities that could have resulted in occupational exposure; and

(b) Assume that the person is not available for planned special exposures.

7. The licensee or registrant shall retain the records on the form regarding history of cumulative occupational exposure until the Division terminates each license or registration requiring the records. The licensee or registrant shall retain each record used in preparing the form regarding history of cumulative occupational exposure for at least 3 years after that record is made.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.3655 Records of planned special exposures. ([NRS 459.201](#))

1. For each planned special exposure authorized by a licensee or registrant pursuant to [NAC 459.329](#), that licensee or registrant shall maintain records that describe:

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

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

(c) What actions were necessary;

(d) Why those actions were necessary;

(e) What precautions were taken to ensure that doses were maintained at a level which was as low as was reasonably achievable;

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

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

2. The licensee or registrant shall retain the records required pursuant to subsection 1 until the Division authorizes their disposal.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3665 Records of results from individual monitoring. ([NRS 459.030](#), [459.201](#))

1. Each licensee and registrant shall maintain records of doses received by all persons for whom monitoring is required pursuant to [NAC 459.339](#), and records of doses received by persons during planned special exposures, accidents and emergency conditions. These records must include, when applicable:

- (a) The deep-dose equivalent to the whole body, lens dose equivalent, shallow-dose equivalent to the skin and shallow-dose equivalent to the extremities;
- (b) The estimated intake of radionuclides;
- (c) The committed effective dose equivalent assigned to the intake of radionuclides;
- (d) The specific information used to calculate the committed effective dose equivalent pursuant to [NAC 459.3275](#) and, when required, pursuant to [NAC 459.339](#);
- (e) The total effective dose equivalent, when required pursuant to [NAC 459.3255](#); and
- (f) The total of the deep-dose equivalent and the committed dose to the organ receiving the highest total dose.

2. The licensee or registrant shall make entries of the records specified in this section at intervals not to exceed 1 year.

3. The licensee or registrant shall maintain the records required pursuant to this section on a record of occupational exposure for a monitoring period, in accordance with the instructions for that form provided by the Division.

4. The licensee or registrant shall maintain the records of doses to an embryo with the records of doses to the woman carrying the embryo who has declared her pregnancy. The records of the declaration of pregnancy, including the estimated date of conception, must also be maintained, but may be maintained separately from the records regarding doses.

5. The licensee or registrant shall retain each form or record required by this section until the Division authorizes its disposal.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.367 Records of dose to individual members of public. ([NRS 459.201](#))

1. Each licensee and registrant shall maintain records sufficient to demonstrate compliance with the limits specified in [NAC 459.335](#) for members of the public.

2. The licensee or registrant shall retain the records required by this section until the Division authorizes their disposal.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3673 Records of disposal of waste. ([NRS 459.201](#)) Each licensee shall maintain records of the disposal of licensed radioactive materials made pursuant to the provisions of [NAC 459.010](#) to [459.950](#), inclusive, including any burial authorized before April 27, 1984. The licensee shall retain the records required by this section until the Division terminates each license or registration requiring the records.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.3675 Records of tests on entry control devices for very high radiation areas. ([NRS 459.201](#))

1. Each licensee and registrant shall maintain records of tests made pursuant to [NAC 459.345](#) on entry control devices for very high radiation areas. These records must include the date, time and results of each such test of function.

2. The licensee or registrant shall retain each record required by this section for at least 3 years after the record is made.

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.368 Notice and reports to persons exposed to radiation or radioactive material. ([NRS 459.070](#), [459.201](#))

1. Requirements for notification and reports to persons of exposure to radiation or radioactive material are specified in [NAC 459.786](#).

2. When a licensee or registrant is required by [NAC 459.371](#) to report to the Division any exposure of a person to radiation or radioactive material, the licensee or registrant shall also notify the person who was exposed. The notice must be transmitted at a time not later than the transmittal to the Division, and the notice must comply with the provisions of subsection 1 of [NAC 459.786](#).

[Bd. of Health, Radiation Control Reg. §§ 4.5.6 & 4.5.6.1, eff. 2-28-80]—(NAC A 1-18-94)

NAC 459.369 Requirements for report of lost, stolen or missing licensed radioactive material or radiation machines. ([NRS 459.201](#))

1. Each licensee and registrant shall report to the Division by telephone:

(a) Any lost, stolen or missing licensed radioactive material in an aggregate quantity which is equal to or greater than 1,000 times the quantity specified in Appendix C, if it appears to the licensee that an exposure could result to persons in unrestricted areas. The report must be made immediately after the occurrence becomes known to the licensee.

(b) Any lost, stolen or missing licensed radioactive material in an aggregate quantity which is greater than 10 times the quantity specified in Appendix C within 30 days after the occurrence becomes known to the licensee. The report is not required if the material is located or otherwise recovered by the licensee or registrant within the specified 30-day period.

(c) A lost, stolen or missing radiation machine. The report must be made immediately after the occurrence becomes known to the registrant.

2. Each licensee and registrant required to make a report pursuant to subsection 1 shall, within 30 days after making the report by telephone, file a written report with the Division setting forth the following information:

(a) A description of the licensed or registered source of radiation that is lost, stolen or missing, including:

(1) For licensed radioactive material, the kind, quantity, and chemical and physical form of the material; and

(2) For a radiation machine, the manufacturer and model and serial number of the machine and the type and maximum energy of radiation emitted from the machine.

(b) A description of the circumstances under which the loss or theft occurred.

(c) A statement of disposition, or probable disposition, of the licensed or registered source of radiation.

(d) Exposures of persons to radiation emitted from the licensed or registered source of radiation, the circumstances under which the exposures occurred and the possible total effective dose equivalent to persons in unrestricted areas.

(e) Actions that have been taken, or will be taken, to recover the source of radiation.

(f) 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.

3. After filing the report required pursuant to subsection 2, the licensee or registrant shall, within 30 days after he learns of any additional substantive information regarding the loss or theft, file an additional written report with the Division.

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

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.3695 Report of certain incidents. ([NRS 459.030](#), [459.070](#), [459.201](#))

1. Each licensee and registrant shall immediately report to the Division each event involving a source of radiation possessed by the licensee or registrant that may have caused, or threatens to cause:

(a) A person to receive:

(1) A total effective dose equivalent of 25 rems (250 millisieverts) or more;

(2) A lens dose equivalent of 75 rems (750 millisieverts) or more; or

(3) A shallow-dose equivalent to the skin or extremities or a total organ dose equivalent of 250 rads (2.5 grays) or more.

(b) The release of radioactive material, inside or outside a restricted area, in a manner in which, had a person been present for 24 hours, the person could have received an intake of radiation that is five times the annual limit on intake for occupational exposure. The provisions of this paragraph do not apply to an area where personnel are not normally stationed during routine operations.

2. Except as otherwise provided in [NAC 459.369](#), each licensee and registrant shall, within 24 hours after discovery, report to the Division each event involving the loss of control of a licensed or registered source of radiation possessed by the licensee or registrant that may have caused, or threatens to cause:

(a) A person to receive, in a period of 24 hours:

(1) A total effective dose equivalent exceeding 5 rems (50 millisieverts);

(2) A lens dose equivalent exceeding 15 rems (150 millisieverts); or

(3) A shallow-dose equivalent to the skin or extremities or a total organ dose equivalent exceeding 50 rems (500 millisieverts).

(b) The release of radioactive material, inside or outside a restricted area, in a manner in which, had a person been present for 24 hours, the person could have received an intake of radiation that is more than the annual limit on intake for occupational exposure. The provisions of this paragraph do not apply to an area where personnel are not normally stationed during routine operations.

3. The licensee or registrant shall prepare each report filed with the Division pursuant to this section so that the names of persons who have received exposure are stated in a separate and detachable portion of the report.

4. Licensees or registrants shall make the reports required by subsections 1 and 2 to the Division by telephone, telegram, mailgram or facsimile.

5. The provisions of this section do not apply to doses that result from planned special exposures, if such doses are within the limits for planned special exposures and are reported pursuant to [NAC 459.371](#).

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.371 Submission of written reports for certain occurrences; contents of reports. ([NRS 459.030](#), [459.070](#), [459.201](#))

1. In addition to the notification required by [NAC 459.3695](#), each licensee and registrant shall submit a written report to the Division within 30 days after learning of any of the following occurrences:

(a) Incidents for which notification is required pursuant to [NAC 459.3695](#).

(b) Doses in excess of:

(1) The limits for an occupational dose for an adult specified in [NAC 459.325](#);

(2) The limits for an occupational dose for a minor specified in [NAC 459.331](#);

(3) The limits for an embryo of a woman who has declared her pregnancy specified in [NAC 459.333](#);

(4) The limits for a member of the public specified in [NAC 459.335](#);

(5) Any applicable limits set forth in the license or registration; or

(6) The constraints on air emissions of radioactive material, excluding radon 222 and its decay products, specified in subsection 2 of [NAC 459.321](#).

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

(1) A restricted area in excess of any applicable limits set forth in the license or registration; or

(2) An unrestricted area in excess of 10 times the applicable limits set forth in [NAC 459.010](#) to [459.950](#), inclusive, or in the license or registration.

(d) For licensees subject to the provisions of the generally applicable environmental standards for radiation of the United States Environmental Protection Agency set forth in 40 C.F.R. Part 190, levels of radiation or releases of radioactive material in excess of those standards, or of conditions set forth in the license related to those standards.

2. Each report required pursuant to subsection 1 must describe the extent of exposure of persons to radiation and radioactive material, including, as appropriate:

- (a) Estimates of the dose of each person;
- (b) The levels of radiation and concentrations of radioactive material involved;
- (c) The cause of the elevated exposures, dose rates or concentrations; and
- (d) Corrective steps taken or planned to ensure against a recurrence, including, without limitation, the schedule for achieving conformance with applicable limits, constraints on air emissions of radioactive material, excluding radon 222 and its decay products, specified in subsection 2 of [NAC 459.321](#), generally applicable environmental standards for radiation of the United States Environmental Protection Agency and associated conditions set forth in the license or registration.

3. Each report filed pursuant to this section must include, for each person exposed, his name, social security number and date of birth. With respect to reports of exposure to an embryo, the information must relate to the woman carrying the embryo. The report must be prepared so that the information required by this subsection is stated in a separate and detachable portion of the report.

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99; A by Dep't of Human Resources by R137-01, 5-30-2003)

NAC 459.3715 Submission of written reports after planned special exposures. ([NRS 459.201](#)) Each licensee and registrant shall submit a written report to the Division within 30 days following any planned special exposure conducted in accordance with [NAC 459.329](#) informing the Division that a planned special exposure was conducted, and including the date the planned special exposure occurred and the information required by [NAC 459.3655](#).

(Added to NAC by Bd. of Health, eff. 1-18-94)

NAC 459.373 Additional reporting requirements. ([NRS 459.201](#)) In addition to complying with any other reporting requirements specified in [NAC 459.010](#) to [459.950](#), inclusive, a licensee shall comply with the following reporting requirements:

1. Each licensee shall notify the Division as soon as possible, but not later than 4 hours, after the discovery of an event that prevents immediate protective actions to be taken that are necessary to avoid exposure to radiation or radioactive materials that could exceed the limits specified in [NAC 459.010](#) to [459.950](#), inclusive.

2. Each licensee shall notify the Division within 24 hours after the discovery of any of the following events involving licensed radioactive material:

(a) An unplanned event causing radioactive contamination that:

(1) Requires access to the contaminated area by workers or members of the public to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area, if such a restriction is imposed for any reason other than to allow isotopes with a half-life of less than 24 hours to decay in storage before decontamination; and

(2) Involves a quantity of radioactive material which is greater than five times the lowest annual limit on intake specified in Appendix B for that material.

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

(1) The equipment is required pursuant to [NAC 459.010](#) to [459.950](#), inclusive, or as a condition of a license, to prevent releases of or exposure to radioactive materials exceeding the limits specified in [NAC 459.010](#) to [459.950](#), inclusive, or to mitigate the consequences of an accident;

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

(3) Other equipment is not available and operable to perform the required safety function.

(c) An event that requires unplanned medical treatment at a medical facility for a person who has spreadable radioactive contamination on his clothing or body.

(d) An unplanned fire or explosion damaging any licensed radioactive material or any device, container or equipment containing licensed radioactive material if:

(1) The quantity of radioactive material involved is greater than five times the lowest annual limit on intake specified in Appendix B for that radioactive material; and

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

3. Reports made by a licensee pursuant to this section must be made as follows:

(a) A licensee shall make the reports required by subsections 1 and 2 by telephone. To the extent that the information is available at the time of notification by telephone, the information provided in these reports must include, without limitation:

- (1) The name and telephone number of the caller;
- (2) A description of the event, including, without limitation, the date and time of the event;
- (3) The exact location of the event;
- (4) The isotopes, quantities and chemical and physical form of the licensed radioactive material involved;

and

- (5) Any data regarding the exposure of persons to radiation because of the event.

(b) Except as otherwise provided in paragraph (c) of this subsection, each licensee who makes a report by telephone shall submit a written report to the Division within 30 days after the report by telephone is made. The written report must contain:

(1) A description of the event, including, without limitation, the probable cause of the event and the manufacturer and model number of any equipment that failed or malfunctioned;

- (2) The exact location of the event;
- (3) The isotopes, quantities and chemical and physical form of the licensed radioactive material involved;
- (4) The date and time of the event;
- (5) Any corrective actions taken or planned regarding the event;
- (6) The results of any evaluations or assessments regarding the event; and

(7) The extent of any exposure of persons to radiation or to radioactive materials because of the event, without identifying those persons by name.

(c) A licensee is not required to comply with the provisions of paragraph (b) if a report submitted pursuant to [NAC 459.010](#) to [459.950](#), inclusive, contains all the information required by paragraph (b).

(Added to NAC by Bd. of Health, eff. 1-18-94; A by R084-98, 1-26-99)

NAC 459.374 Notice of intent to vacate premises. ([NRS 459.201](#)) Each specific licensee must, no less than 30 days before vacating or relinquishing possession or control of premises which may have been contaminated with radioactive material as a result of his activities, notify the Division in writing of intent to vacate. When deemed necessary by the Division, the licensee shall decontaminate the premises in the manner specified by the Division.

[Bd. of Health, Radiation Control Reg. § 4.5.5, eff. 2-28-80]

Notices; Instructions and Reports to Employees; Inspections

NAC 459.780 Purpose; applicability. ([NRS 459.201](#)) [NAC 459.780](#) to [459.794](#), inclusive:

1. Establish requirements for notices, instructions and reports by licensees or registrants to persons engaged in work under a license or registration and options available to those persons in connection with the Division's inspections of licensees or registrants to ascertain compliance with the provisions of [chapter 459](#) of NRS and regulations, orders and licenses issued thereunder regarding radiological working conditions.

2. Apply to all persons who receive, possess, use or transfer sources of radiation licensed by or registered with the Division pursuant to [NAC 459.150](#) to [459.314](#), inclusive.

[Bd. of Health, Radiation Control Reg. § 10.1, eff. 2-28-80]

NAC 459.782 Notices to employees. ([NRS 459.201](#))

1. Each licensee or registrant shall post current copies of the following documents:

(a) The provisions of [NAC 459.320](#) to [459.374](#), inclusive, and [459.780](#) to [459.794](#), inclusive;

(b) The license, certificate of registration, conditions or documents incorporated into the license by reference and amendments thereto;

- (c) The operating procedures applicable to work under the license or registration; and
- (d) Any notice of a violation involving radiological working conditions, any proposed imposition of a civil penalty or an order issued pursuant to [NAC 459.010](#) to [459.142](#), inclusive, and any response from the licensee or registrant.

2. If posting of a document specified in paragraphs (a) to (c), inclusive, of subsection 1 is not practicable, the licensee or registrant shall post a notice which describes the document and states where it may be examined.

3. Form NRC-1, "Notice to Employees," must be posted by each licensee or registrant.

4. Any notices, forms or other documents posted must appear in a sufficient number of places to permit persons engaged in work under the license or registration to observe them on the way to or from any particular work location to which the document applies. The documents must be conspicuous and must be replaced if defaced or altered.

5. Documents to be posted pursuant to paragraph (d) of subsection 1 must be posted within 5 working days after receipt of the documents from the Division. The licensee's or registrant's response, if any, must be posted within 5 working days after dispatch from the licensee or registrant. These documents must remain posted for a minimum of 5 working days or until action correcting the violation has been completed, whichever is later.

[Bd. of Health, Radiation Control Reg. §§ 10.2-10.2.5, eff. 2-28-80]—(NAC A 1-18-94)

NAC 459.784 Instructions to employees. ([NRS 459.201](#))

1. All persons who in the course of employment are likely to receive in 1 year an occupational dose of more than 100 millirems must:

(a) Be informed of the storage, transfer or use of radioactive material or of radiation;

(b) Be instructed in the problems of health protection associated with exposure to such radioactive material or radiation;

(c) Be instructed in precautions or procedures to minimize exposure and in the purposes and functions of the protective devices which are provided;

(d) Be instructed in and required to comply with the provisions of [NAC 459.010](#) to [459.794](#), inclusive, and licenses which pertain to the protection of personnel from any exposures to radiation or radioactive materials;

(e) Be informed of their responsibility to report promptly to the licensee or registrant any condition which may cause or lead to a violation of [NAC 459.010](#) to [459.794](#), inclusive, or licenses or any unnecessary exposure to radiation or radioactive material;

(f) Be instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material; and

(g) Be advised of the existence of exposure reports to radiation which workers may request pursuant to [NAC 459.786](#).

2. In determining which persons are subject to the requirements of this section, licensees shall consider:

(a) The assigned activities of the person during normal and abnormal situations involving exposure to radiation or radioactive material that can reasonably be expected to occur during the life of the licensed facility; and

(b) The potential problems relating to the protection against radiation and radioactive material present in the licensed facility.

[Bd. of Health, Radiation Control Reg. §§ 10.3-10.3.8, eff. 2-28-80]—(NAC A by R084-98, 1-26-99)

NAC 459.786 Reporting of certain information. ([NRS 459.070](#), [459.201](#))

1. Data concerning a person's exposure to radiation and the results of any measurements, analyses and calculations of radioactive material deposited or retained in the body of a person must be reported to him, as specified in this section. The information reported must include data and results obtained pursuant to [NAC 459.010](#) to [459.794](#), inclusive, orders or conditions set forth in the license or registration, as shown in records maintained by the licensee or registrant pursuant to those sections. Each notification and report must:

(a) Be in writing;

(b) Include the name of the registrant or licensee, the name of the person and his social security number;

- (c) Include the information relating to the person's exposure; and
- (d) Contain the following statement:

This report is furnished to you pursuant to [NAC 459.780](#) to [459.794](#), inclusive, adopted by the State Board of Health. You should preserve this report for further reference.

2. Each licensee and registrant shall advise each of its workers annually of their exposure to radiation or radioactive material as shown in records maintained by the licensee or registrant pursuant to [NAC 459.3665](#).

3. At the request of a worker formerly engaged in work controlled by the licensee or the registrant, the licensee or registrant shall furnish to the worker a report of his exposure to radiation or radioactive material. The report must be furnished within 30 days after the time the request is made or within 30 days after his exposure has been determined, whichever is later. The report must cover, within the period specified in the request, each calendar quarter in which the worker's activities involved exposure to radiation from radioactive material licensed by or radiation machines registered with the Division and must include the dates and locations of work under the license or registration in which the worker participated during this period.

4. When a licensee or registrant is required pursuant to [NAC 459.3695](#) to report to the Division any exposure of a person to radiation or radioactive material, the licensee or registrant shall also provide the person with a report on his exposure data. The report to the person must be transmitted to him before transmittal of the report to the Division.

5. At the request of a worker who is terminating employment with a licensee or registrant in work involving exposure to radiation in a calendar quarter or of a worker who, while employed by another person, is terminating an assignment to work involving exposure to radiation in the licensee's or registrant's facility in a calendar quarter, the licensee or registrant shall provide the worker at the time of the termination a written report specifying the dose of radiation which he received from the operations of the licensee or registrant during the calendar quarter or fraction thereof or shall provide him a written estimate of that dose if the results of personnel monitoring have not been finally determined and are not available at that time. An estimated dose must be clearly indicated as such.

[Bd. of Health, Radiation Control Reg. §§ 10.4-10.4.5, eff. 2-28-80]—(NAC A 1-18-94)

NAC 459.788 Inspections: Generally; presence of representatives of licensees, registrants and employees. ([NRS 459.201](#))

1. Each licensee or registrant shall permit the Division, at all reasonable times, an opportunity to inspect materials, machines, activities, facilities, premises and records pursuant to [NAC 459.010](#) to [459.794](#), inclusive.

2. During an inspection, division inspectors may consult privately with workers, as specified in [NAC 459.790](#). The licensee or registrant may accompany the Division's inspectors during other phases of an inspection.

3. If, at the time of an inspection, a person has been authorized by the workers to represent them during the inspection, the licensee or registrant must notify the inspectors of the authorization and give the workers' representative an opportunity to accompany the inspectors during the inspection of physical working conditions.

4. Each workers' representative must be routinely engaged in work under control of the licensee or registrant and must have received instructions as specified in [NAC 459.784](#).

5. Different representatives of licensees or registrants and workers may accompany the inspectors during different phases of an inspection if there is no resulting interference with the conduct of the inspection, but only one workers' representative at a time may accompany the inspectors.

6. With the approval of the licensee or registrant and the workers' representative, a person who is not routinely engaged in work under control of the licensee or registrant, for example, a consultant to the licensee or registrant or to the workers' representative, may be afforded the opportunity to accompany division inspectors during the inspection of physical working conditions.

7. Notwithstanding the other provisions of this section, division inspectors may refuse to permit accompaniment by any person who deliberately interferes with a fair and orderly inspection. With regard to any

area containing proprietary information, the workers' representative for that area must be a person previously authorized by the licensee or registrant to enter that area.

[Bd. of Health, Radiation Control Reg. §§ 10.5-10.5.7, eff. 2-28-80]

NAC 459.790 Inspections: Consultation with employees. ([NRS 459.201](#))

1. The inspectors of the Division may consult privately with workers on matters related to their protection from occupational radiation and matters related to applicable provisions of [NAC 459.010](#) to [459.794](#), inclusive, to the extent that the inspectors deem necessary for the conduct of an effective and thorough inspection.

2. During the course of an inspection, any worker may bring privately to the attention of the inspectors, either orally or in writing, any past or present condition which he has reason to believe may have contributed to or caused any violation of [chapter 459](#) of NRS, [NAC 459.010](#) to [459.794](#), inclusive, or license condition, or any unnecessary exposure of a person to radiation from licensed radioactive material or a registered radiation machine under the licensee's or registrant's control. Any such notice in writing must comply with the requirements of subsection 1 of [NAC 459.792](#).

3. Subsection 2 is not an authorization to disregard instructions in [NAC 459.784](#).

[Bd. of Health, Radiation Control Reg. §§ 10.6-10.6.3, eff. 2-28-80]

NAC 459.792 Inspections: Requests by employees. ([NRS 459.201](#))

1. Any worker or representative of workers who believes that a violation of [chapter 459](#) of NRS, [NAC 459.010](#) to [459.794](#), inclusive, or license conditions exists or has occurred in work under a license or a registration with regard to radiological working conditions in which the worker is engaged, may request an inspection by giving notice of the alleged violation to the Division. Any such notice must be in writing, set forth the specific grounds for the notice, and must be signed by the worker or representative of the workers. A copy must be given to the licensee or registrant by the Division no later than at the time of inspection except that, upon the request of the worker giving the notice, his name and the name of the persons referred to therein must not be disclosed in any copy or on any record published, released or made available by the Division, except for good cause shown.

2. If, upon receipt of the notice, the Division determines that the complaint meets the requirements in subsection 1, and that there is a reasonable ground to believe that the alleged violation exists or has occurred, the Division shall cause an inspection to be made as soon as practicable, to determine whether the alleged violation exists or has occurred. Inspections pursuant to this section need not be limited to matters referred to in the complaint.

3. No licensee or registrant may discharge or in any manner discriminate against any worker because the worker has filed any complaint, instituted or caused to be instituted any proceeding under [NAC 459.010](#) to [459.794](#), inclusive, or has testified or is about to testify in any such proceeding or because the worker, on behalf of himself or others, has exercised any option afforded by [NAC 459.780](#) to [459.794](#), inclusive.

[Bd. of Health, Radiation Control Reg. §§ 10.7-10.7.3, eff. 2-28-80]

NAC 459.794 Inspections: Informal review. ([NRS 459.201](#))

1. If the Division determines, with respect to the complaint under [NAC 459.792](#), that an inspection is not warranted because there are no reasonable grounds to believe that a violation exists or has occurred, the Division must notify the complainant in writing of that determination.

2. The complainant may obtain a review of the determination by submitting a written statement of his position with the State Health Officer, who shall provide the licensee or registrant with a copy of the statement by certified mail, excluding, at the request of the complainant, name of the complainant. The licensee or registrant may submit an opposing written statement of position with the State Health Officer, who shall provide the complainant with a copy of the statement by certified mail. Upon request of the complainant, the State Health Officer may hold an informal conference, pursuant to subsection 2 of [NAC 459.136](#), in which the complainant and licensee or registrant, may orally present their views. An informal conference may also be held at the request of the licensee or registrant, but disclosure of the identity of the complainant may be made only

following receipt of his written authorization. After considering all written or oral views presented, the State Health Officer shall affirm, modify or reverse the determination of the Division and furnish the complainant and the licensee or registrant a written notification of the decision and the reason therefore.

3. The informal conference cannot be appealed and is the final remedy available to the complainant or the licensee or registrant pursuant to subsection 3 of [NAC 459.136](#).

4. If the Division determines that an inspection is not warranted because the requirements of subsection 1 of [NAC 459.792](#) have not been met, the Division shall notify the complainant in writing of that determination. Such a determination is without prejudice to the filing of a new complaint meeting the requirements of that subsection.

[Bd. of Health, Radiation Control Reg. §§ 10.8-10.8.4, eff. 2-28-80]—(NAC A 10-30-97)