

INFORMAL SECTION ROUGH DRAFT – APRIL 2005

**MICHIGAN DEPARTMENT OF COMMUNITY HEALTH
RADIATION SAFETY SECTION
IONIZING RADIATION RULES**

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A majority of this part and the revisions are based on the suggested state regulations and the NRC's Part 20.

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PART 54. STANDARDS FOR PROTECTION AGAINST RADIATION

R325.5201. Purpose and scope.

Rule 201. (1) This part establishes standards for protection against ionizing radiation hazards resulting from activities conducted pursuant to registrations issued by the department. Except as otherwise specifically provided, this part applies to all ~~licensees and registrants.~~

Clarified for new, radiation machine only regulation. Other changes in this part that are not explained are also to remove any reference to radioactive materials regulation, which is now under MDEQ.

(2) The requirements of part 4 are designed to control the receipt, possession, use, and transfer of radiation machines by any registrant so the total dose to an individual, including doses resulting from all sources of radiation other than background radiation, does not exceed the standards for protection against radiation prescribed in part 4. The limits in this part do not apply to doses due to medical diagnosis or therapy by licensed members of the healing arts, or to voluntary participation in medical research programs. Nothing in this part shall be construed as limiting actions that may be necessary to protect health and safety.

From suggested state regulations D.1(b) and D.2 and modified for radiation machines.

~~**(2)(3)**~~ In addition to complying with requirements set forth in this part, every reasonable effort should be made to maintain radiation levels in unrestricted areas ~~and releases of radioactive materials in effluents to unrestricted areas, as far below the limits specified in this part as practicable. The term "as far below the limits specified in this part as practicable" means as low as is practicably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and in relation to the utilization of sources of radiation in the public interest.~~ as low as reasonably achievable (ALARA).

See new rule 203(2).

~~[Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.]~~

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77 **R325.5202. Definitions.**

78
79 **Rule 202. (1) As used in this part:**

80 **(a) "ALARA" means making every reasonable effort to maintain exposures to radiation as far below the**
81 **dose limits in this part as is practical consistent with the purpose for which the registered activity is**
82 **undertaken, taking into account the state of technology, the economics of improvements in relation to state**
83 **of technology, the economics of improvements in relation to benefits to the public health and safety, and**
84 **other societal and socioeconomic considerations.**

85 **(b) "Declared pregnant woman" means a woman who has voluntarily informed the registrant, in writing, of**
86 **her pregnancy and the estimated date of conception. The declaration remains in effect until the declared**
87 **pregnant woman withdraws the declaration in writing or is no longer pregnant.**

88 **(c) "Dosimetry processor" means an individual or an organization that processes and evaluates individual**
89 **monitoring equipment in order to determine the radiation dose delivered to the monitoring equipment.**

90 **(d) "Quarter" means a period of time of approximately 13 consecutive weeks equal to one-fourth of the year**
91 **observed by the registrant, providing that the beginning of the first quarter in a year occurs in January and**
92 **that no day is omitted or duplicated in consecutive quarters.**

93 **(e) "Survey" means a critical evaluation of a facility or area incident to the production, use, or presence of**
94 **radiation machines under a specific set of conditions to determine actual or potential radiation hazards.**
95 **When appropriate, the evaluation includes tests, physical examination, and measurements of levels of**
96 **radiation.**

97 **(f) "Very high radiation area" means an area, accessible to individuals, in which radiation levels from**
98 **radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 5**
99 **Gy (500 rad) in 1 hour at 1 meter from a source of radiation or 1 meter from any surface that the radiation**
100 **penetrates.¹**

101
102 **R325.52023. Intentional exposure of humans.**

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104 | ~~**Rule 202. (1)** Nothing in these rules shall be construed as limiting the intentional exposure of patients to~~
105 | ~~radiation for the purpose of medical diagnosis, medical therapy or medical research conducted by licensed~~
106 | ~~members of the healing arts.~~

Moved into 201(2) above.

107 |
108 | ~~**(2)Rule 203.** Intentional exposure of individuals to radiation or concentrations of radioactive material for~~
109 | ~~diagnostic or therapeutic purposes shall be limited to supervision or prescriptions by licensed members of the~~
110 | ~~healing arts.~~

111 |
112 | ~~**(3)** Nothing in these rules shall be construed as authorization to conduct medical diagnosis, medical~~
113 | ~~therapy or medical research which is not fully consistent with the standards of practice for licensed members~~
114 | ~~of the healing arts.~~

115 |
116 | ~~*[Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance*~~
117 | ~~*are under the purview of the Michigan Department of Consumer & Industry Services.]*~~

118 |
119 | **R325.5204. Radiation protection programs.**

120 |
121 | **Rule 204. (1)** Each licensee or registrant shall develop, document, and implement a radiation protection
122 | program commensurate with the scope and extent of registered activities and sufficient to ensure compliance
123 | with the provisions of part 5.

124 |
125 | **(2)** The registrant shall use, to the extent practical, procedures and engineering controls based upon
126 | sound radiation protection principles to achieve occupational doses and doses to members of the public that
127 | are as low as is reasonably achievable (ALARA).

1 | *At very high doses received at high dose rates, units of absorbed dose, gray and rad, are appropriate, rather than units of dose equivalent, sievert and rem.*

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129 | (3) The registrant shall periodically (at least annually) review the radiation protection program content and
130 | implementation.

131

New Rule 204 is taken from Sec D.101 of the suggested state regulations and NRC's Part 20.

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133

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**PERMISSIBLE DOSES, LEVELS AND
CONCENTRATIONS**

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DOSE LIMITS

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In order to improve clarity, the following dose limit sections are being struck, and replaced with the updated dose limit sections from the suggested state regulations as needed for radiation machine control.

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140

~~R325.5203. Exposure of individuals to radiation.~~

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~~**Rule 203. 1)** Except as provided in subrules (3), (4) and (6) a licensee or registrant shall not receive, possess, use or transfer sources of radiation in such a manner as to cause any individual to receive in any period from all sources of radiation in the licensee's or registrant's possession a dose in excess of the limits specified in table 1 of rule 205. A licensee or registrant shall not be held liable for meeting the dose limit for fertile women (with respect to fetus) listed in table 1 until and unless the employee has submitted written notice to the licensee or registrant of the pregnant condition. Potential risk of exposure if any, to the fetus before the written notice is received shall be assumed by the employee as a condition of employment as a radiation worker. Following receipt of written notice, the employee's dosimeter record shall be reviewed immediately and necessary steps shall be taken to meet the dose limit specified in table 1 of rule 205.~~

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~~**(2)** For determining the doses specified in rules 203 to 215, a dose from x- or gamma rays up to 10 MeV may be assumed to be equivalent to the exposure measured by a properly calibrated appropriate instrument in air at or near the body surface of the region of the highest exposure rate.~~

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~~**(3)** A licensee or registrant may permit an individual in a restricted area to receive a dose to the whole body greater than that permitted in subrule (1) if:~~

156

157

~~**(a)** The annual dose does not exceed 5 rems in any 1 year and during any calendar quarter the dose to the whole body from sources of radiation in the licensee's or registrant's possession does not exceed 3 rems.~~

158

159

160

~~**(b)** The dose to the whole body, when added to the accumulated occupational dose to the whole body, does not exceed 5 (N-18) rems where "N" equals the individual's age in years at his last birthday.~~

161

162

~~**(c)** The licensee or registrant has determined the individual's accumulated occupational dose to the whole body on Form RH-101, or on a clear and legible record containing all the information required in that form and has otherwise complied with the requirements of rule 206.~~

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~~**(4)** Upon application showing an operational need, the department may authorize radiation doses at a higher annual level than the limits set forth in subrule (1) provided that the dose does not exceed 3 rems per quarter and that, based on the determination of the individual's prior radiation record, his accumulated occupational dose does not exceed 5 (N-18) rems where "N" equals the individual's age in years at his last birthday.~~

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~~**(5)** As used in this part "dose to the whole body" includes any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of the eye.~~

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~~(6) Nothing in this part shall be interpreted as limiting the exposure of members of emergency response teams to radiation under emergency circumstances for the purpose of minimizing danger to life or property. Such teams may include police, fire, ambulance and paramedical crews acting in the course of their assigned duties.~~

~~[Note: As a result of Executive Orders 1996-1 and 1996-2, the authority, powers, duties, functions, and responsibilities of the radiation machine registration, licensing, and compliance program were transferred to the Michigan Department of Consumer & Industry Services. The Department of Consumer & Industry Services has renamed Form RH-101 to BHS/HFS-101.]~~

~~**R325.5205. Dose limits.**~~

~~**Rule 205.**~~

~~**TABLE 1**~~

~~**Maximum Permissible Dose Equivalent
for Occupational Exposure**~~

~~Dose to the whole body* 1.25 rem per quarter
Skin of whole body 7.5 rems per quarter
Hands 18.75 rems per quarter
Fertile women
(with respect to fetus) 0.5 rem in gestation period~~

~~**Maximum Permissible Dose Equivalent
for Non-Occupational Exposure**~~

~~Individual 0.5 rem in any one year~~

~~**Population Dose Limits**~~

~~Genetic 0.17 rem average per year
Somatic 0.17 rem average per year~~

~~*If the dose distribution is not uniform the limiting dose shall be the highest dose received by any of the critical organs specified in subrule (5) of rule 203.~~

~~**R325.5206. Determination of accumulated dose.**~~

~~**Rule 206. (1)** This rule contains requirements which shall be satisfied by licensees or registrants who propose, pursuant to rules 203 (3) or (4), to permit individuals in a restricted area to receive radiation doses in excess of the limits specified in table 1 of rule 205.~~

~~**(2)** Before permitting an individual in a restricted area to be exposed to radiation in excess of the limits specified in table 1 of rule 205, each licensee or registrant shall:~~

~~**(a)** Obtain a certificate on Form RH-101, or on a clear and legible record containing all the information required in that form, signed by the individual, showing each period of time after the individual attained the age of 18 in which the individual received an occupational dose of radiation.~~

~~**(b)** Calculate on Form RH-101, in accordance with the instructions appearing therein, or on a clear and legible record containing all the information required in that form, the previously accumulated occupational dose received by the individual and the additional dose allowed for the individual under rules 203 (3) or (4).~~

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~~(3) In the preparation of Form RH-101, or on a clear and legible record containing all the information required in that form, the licensee or registrant shall make a reasonable effort to obtain reports of the individual's previously accumulated occupational dose. For each period for which the licensee or registrant obtains these reports, he shall use the dose shown in the report in preparing the form. Where a licensee or registrant is unable to obtain reports of the individual's occupational dose for a previous complete calendar quarter, it shall be assumed that the individual has received the occupational dose specified in whichever of the following columns apply:~~

	COLUMN 1	COLUMN 2
	Assumed Dose in	Assumed Dose in
	Rems for Calendar	For Calendar
	Quarters Before	Beginning on or After
Part of Body	January 1, 1961	January 1, 1961
Whole body, gonads, active blood-forming organs, head and trunk, lens of the eye	3.75	1.25

~~(4) The licensee or registrant shall retain and preserve records used in preparing Form RH-101. If calculation of the individual's accumulated occupational dose for all periods before January 1, 1961, yields a result higher than the applicable accumulated dose value for the individual as of that date, as specified in rule 205, the excess may be disregarded.~~

~~[Note: As a result of Executive Orders 1996-1 and 1996-2, the authority, powers, duties, functions, and responsibilities of the radiation machine registration, licensing, and compliance program were transferred to the Michigan Department of Consumer & Industry Services. The Department of Consumer & Industry Services has renamed Form RH-101 to BHS/HFS-101.]~~

R325.5210. Exposure of minors.

~~**Rule 210. (1)** A licensee or registrant shall not receive, acquire, possess, use or transfer sources of radiation in such a manner as to cause an individual who is under 18 years of age, to receive in any period of 1 calendar quarter from all sources of radiation in the licensee's or registrant's possession a dose in excess of 10% of the quarterly occupational limit specified in rule 205 (e.g. 125 mrem whole body).~~

~~(2) A licensee shall not receive, acquire, possess, use or transfer radioactive material in such a manner as to cause any individual in a restricted area, who is under 18 years of age, to be exposed to airborne radioactive material in an average concentration in excess of the limits specified in table II of appendix A in rules 261 to 270. For purposes of this subrule, concentrations may be averaged over periods not greater than 1 week (7 consecutive days).~~

~~(3) Rule 208 (1) shall apply where an individual is exposed subject to subrule (2).~~

~~[Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.]~~

R325.5211. Radiation levels from external sources in unrestricted areas.

~~**Rule 211. (1)** Except as authorized by the department pursuant to subrule (2), a licensee or registrant shall not receive, acquire, possess, use or transfer sources of radiation in such a manner as to result in an individual in an unrestricted area receiving a dose in excess of:~~

- ~~(a) Two millirems in any 1 hour.~~
- ~~(b) One hundred millirems in any 7 consecutive days.~~
- ~~(c) Five hundred millirems in any 1 year.~~

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287
288 ~~(2) — A person may apply to the department of proposed limits upon levels of radiation in unrestricted areas~~
289 ~~in excess of those specified in subrule (1) resulting from the applicants possession or use of sources of~~
290 ~~radiation. The application shall include information as to anticipated average radiation levels and anticipated~~
291 ~~occupancy times for each unrestricted area involved. The department shall approve the proposed limits if the~~
292 ~~applicant demonstrates to the satisfaction of the department that the proposed limits are not likely to cause~~
293 ~~any individual to receive a dose to the whole body in any period of 1 calendar year in excess of 0.5 rem.~~
294
295

296 **R325.5205. Occupational dose limits**

297
298 **Rule 205. (1) The registrant shall control the occupational dose to individual adults to the following dose**
299 **limits:**

300 **(a) An annual limit, which is the more limiting of:**

301 **(i) _____ The total effective dose equivalent being equal to 0.05 Sv (5 rem). Or,**

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

304 **(b) the annual limits to the lens of the eye, to the skin, and to the extremities which are:**

305 **(i) _____ A lens dose equivalent of 0.15 Sv (15 rem).**

306 **(ii) _____ A shallow dose equivalent of 0.5 Sv (50 rem) to the skin or to any extremity.**

307
308 **(2) The assigned deep dose equivalent and shallow dose equivalent shall be for the portion of the body**
309 **receiving the highest exposure:**

310 **(a) The deep dose equivalent, lens dose equivalent and shallow dose equivalent may be assessed from**
311 **surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational**
312 **dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the**
313 **results of individual monitoring are unavailable.**

314 **(b) When a protective apron is worn while working with medical fluoroscopic equipment and monitoring is**
315 **conducted as specified in these rules, the effective dose equivalent for external radiation shall be**
316 **determined as follows:**

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317 (i) When only one individual monitoring device is used and it is located at the neck outside the
318 protective apron, the reported deep dose equivalent shall be the effective dose equivalent for external
319 radiation.

320 (ii) When individual monitoring devices are worn, both under the protective apron at the waist and
321 outside the protective apron at the neck, the effective dose equivalent for external radiation shall be
322 assigned the value of the sum of the deep dose equivalent reported for the individual monitoring device
323 located at the waist under the protective apron multiplied by 1.5 and the deep dose equivalent reported for
324 the individual monitoring device located at the neck outside the protective apron multiplied by 0.04.

325
326 (3) The registrant shall reduce the dose that an individual may be allowed to receive in the current year by
327 the amount of occupational dose received while employed by any other person during the current year.

328
329 **R325.5206. Determination of prior occupational dose**

330
331 **RULE 206. (1) For each individual who may enter the registrant's restricted area and is likely to**
332 **receive, in a year, an occupational dose requiring monitoring pursuant to rule 222, the registrant shall:**

333 (a) Determine the occupational radiation dose received during the current year.

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

335
336 (2) In complying with the requirements of rule 206(1), a registrant may:

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

341 (b) Accept, as the record of lifetime cumulative radiation dose, an up-to-date form bhs/hfs-101 or
342 equivalent, signed by the individual and countersigned by an appropriate official of the most recent employer
343 for work involving radiation exposure, or the individual's current employer, if the individual is not employed
344 by the registrant.

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345 (c) Obtain reports of the individual's dose equivalent from the most recent employer for work involving
346 radiation exposure, or the individual's current employer, if the individual is not employed by the registrant, by
347 telephone, telegram, facsimile, or letter. The registrant shall request a written verification of the dose data if
348 the authenticity of the transmitted report cannot be established.

349
350 (3) The registrant shall record the exposure history, as required by rule 206(1), on form BHS/FHS-101, or
351 other clear and legible record, of all the information required on that form. The form or record shall show each
352 period in which the individual received occupational exposure to radiation and shall be signed by the individual
353 who received the exposure. For each period for which the registrant obtains reports, the registrant shall use
354 the dose shown in the report in preparing form BHS/FHS-101 or equivalent. For any period in which the
355 registrant does not obtain a report, the registrant shall place a notation on form BHS/FHS-101 or equivalent
356 indicating the periods of time for which data are not available.

357
358 (4) If the registrant is unable to obtain a complete record of an individual's current and previously
359 accumulated occupational dose, the registrant shall assume in establishing administrative controls pursuant to
360 rule 206(4) for the current year, that the allowable dose limit for the individual is reduced by 12.5 mSv (1.25
361 rem) for each quarter for which records were unavailable and the individual was engaged in activities that
362 could have resulted in occupational radiation exposure.

363
364 (5) The licensee or registrant shall retain the records on form BHS/FHS-101 or equivalent until the
365 department terminates each pertinent registration requiring this record. The registrant shall retain records
366 used in preparing form BHS/FHS-101 or equivalent for 3 years after the record is made.

367
368 **R325.5207. Occupational dose limits for minors.**

369
370 **Rule 207.** The annual occupational dose limits for minors are 10 percent of the annual occupational
371 dose limits specified for adult workers in rule 205.

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373 **R325.5208. Dose to an embryo/fetus.**

374

375 **Rule 208. (1)** The registrant shall ensure that the dose equivalent to an embryo/fetus during the entire
376 pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 5 mSv (0.5
377 rem).

378

379 **(2)** The registrant shall make efforts to avoid substantial variation² above a uniform monthly exposure rate
380 to a declared pregnant woman so as to satisfy the limit in rule 208(1).

381

382 **(3)** The dose equivalent to the embryo/fetus is the sum of:

383 **(a)** The deep dose equivalent to the declared pregnant woman.

384 **(b)** The dose equivalent resulting from radionuclides in the embryo/fetus and radionuclides in the declared
385 pregnant woman.

386

387 **(4)** If the dose equivalent to the embryo/fetus is found to have exceeded 4.5 mSv (0.45 rem), or is within
388 0.5 mSv (0.05 rem) of this dose, by the time the woman declares the pregnancy to the registrant, the registrant
389 shall be deemed to be in compliance with rule 208(1) if the additional dose to the embryo/fetus does not
390 exceed 0.5 mSv (0.05 rem) during the remainder of the pregnancy.

391

392 **R325.5210. Dose limits for individual members of the public.**

393

394 **Rule 210. (1)** Each registrant shall conduct operations so that:

395 **(a)** The total effective dose equivalent to individual members of the public from the registered operation
396 does not exceed 1 mSv (0.1 rem) in a year, exclusive of the dose contribution from background radiation,
397 from any medical administration the individual has received, from exposure to individuals administered
398 radioactive material, and from voluntary participation in medical research programs.

² The National Council on Radiation Protection and Measurements recommended in NCRP Report No. 91 "Recommendations on Limits for Exposure to Ionizing Radiation" (June 1, 1987) that no more than 0.5 mSv (0.05 rem) to the embryo/fetus be received in any one month.

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399 (b) The dose in any unrestricted area from external sources does not exceed 0.02 mSv (0.002 rem) in any
400 one hour.

401 (c) The total effective dose equivalent to individual members of the public from infrequent exposure to
402 radiation from radiation machines does not exceed 5 mSv (0.5 rem) in one year.

403
404 (2) If the registrant permits members of the public to have access to restricted areas, the limits for
405 members of the public continue to apply to those individuals.

406
407 (3) A registrant may apply for prior department authorization to operate up to an annual dose limit for an
408 individual member of the public of 5 mSv (0.5 rem). This application shall include the following information:

409 (a) Demonstration of the need for and the expected duration of operations in excess of the limit in rule
410 210(1)(a).

411 (b) The licensee's or registrant's program to assess and control dose within the 5 milliserverts (0.5 rem)
412 annual limit.

413 (c) The procedures to be followed to maintain the dose ALARA.

414
415 (4) The registrant shall make or cause to be made surveys of radiation levels in unrestricted and
416 controlled areas to demonstrate compliance with the dose limits for individual members of the public in this
417 rule.

418
419 (5) A registrant shall show compliance with the annual dose limit in rule 210(1) by one of the following
420 methods:

421 (a) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual
422 likely to receive the highest dose from the registered operation does not exceed the annual dose limit.

423 (b) Demonstrating that if an individual were continuously present in an unrestricted area, the dose from
424 external sources would not exceed 0.02 mSv (0.002 rem) in an hour and 0.5 mSv (0.05 rem) in a year.

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PRECAUTIONARY PROCEDURES

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R325.5221. Surveys.

~~Rule 221. (1) As used in this rule "survey" means a critical evaluation of a facility or area incident to the production, use, release, disposal or presence of sources of radiation MACHINES under a specific set of conditions to determine actual or potential radiation hazards. When appropriate, the evaluation includes tests, physical examination, source inventory and accountability, and measurements of levels of radiation or concentration of radioactive material present. (1) Each registrant shall make, or cause to be made, surveys that:~~

~~(a) Are necessary for the registrant to comply with part 4.~~

~~(b) Are necessary under the circumstances to evaluate:~~

~~(i) The magnitude and extent of radiation levels; and~~

~~(ii) The potential radiological hazards.~~

Modified and moved to Rule 202 – Definitions.

~~(2) The registrant shall ensure that instruments and equipment used for quantitative radiation measurements are calibrated at intervals not to exceed 12 months for the radiation measured, except when a more frequent interval is specified in another applicable part of these regulations.~~

~~[Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.]~~

R325.5222. Personnel monitoring.

Rule 222. (1) Each licensee or registrant shall supply appropriate personnel monitoring equipment to, shall require the use of such equipment by, and shall demonstrate compliance pursuant to this rule for:

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453 ~~(a) Each individual under such circumstances that he receives, or is likely to receive, a dose in any~~
454 ~~calendar quarter in excess of 25% of the quarterly occupational limit specified in rule 205, (e.g. 300 mrems~~
455 ~~whole body).~~Adults likely to receive, in 1 year from sources external to the body, a dose in excess of 10
456 percent of the limits in rule 205.

457 ~~(b) Each individual under 18 years of age under such circumstances that he receives, or is likely to~~
458 ~~receive, a dose in any calendar quarter in excess of 5% of the quarterly occupational limit specified in rule~~
459 ~~205, (e.g. 60 mrems whole body).~~Minors likely to receive, in 1 year from sources external to the body, a
460 deep dose equivalent in excess of 0.1 rem (1 mSv) or a lens dose equivalent in excess of 0.15 rem (1.5
461 mSv).

462 ~~(c) Each individual, except a patient being intentionally irradiated, who enters a high radiation~~
463 ~~area.~~Declared pregnant women likely to receive during the entire pregnancy, from radiation sources external
464 to the body, a deep dose equivalent in excess of 0.1 rem (1 mSv).

465 ~~(d) Each individual who is likely to receive a dose in excess of 100 millirems in any 5 consecutive days~~
466 ~~while in a room or area occupied by a patient while the patient is receiving therapy from any gamma-emitting~~
467 ~~radioactive material.~~Individuals entering a high or very high radiation area.

468 ~~(e) Individuals working with medical fluoroscopic equipment, portable radiographic and fluoroscopic~~
469 ~~equipment, or holding patients during x-ray exams.~~

470 (i) An individual monitoring device used for the dose to an embryo/fetus of a declared pregnant
471 woman, pursuant to rule 208, shall be located under the protective apron at the waist.

472 (ii) An individual monitoring device used for eye dose equivalent shall be located at the neck,
473 or an unshielded location closer to the eye, outside the protective apron.

474 (iii) When only 1 individual monitoring device is used to determine the effective dose
475 equivalent for external radiation pursuant to rule 205(2)(b), it shall be located at the neck outside the
476 protective apron. when a second individual monitoring device is used, for the same purpose, it shall
477 be located under the protective apron at the waist. the second individual monitoring device is required
478 for a declared pregnant woman.

479 ~~(f) Each individual for whom personnel monitoring is specifically required in registration conditions or~~
480 ~~under other parts of these rules pertaining to specific uses of sources of radiation machines.~~

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Modified according to the suggested state regulations. (Sec. D.502(a).)

481

482 ~~(2) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or~~
483 ~~abdomen. The dosimeter assigned for monitoring the trunk of the body shall not be used for any other~~
484 ~~purposes. If monitoring of other areas of the body (e.g. lens of the eye, extremity) is required by these rules or~~
485 ~~requested by the radiation worker because of the nature of exposure a separate dosimeter shall be assigned~~
486 ~~for this purpose. The separate dosimeter shall be designated as an auxiliary dosimeter and the radiation~~
487 ~~record shall specify the specific area monitored.~~

488

489 ~~(3) If auxiliary dosimeters are assigned in accordance with subrule (2) the specific body area shall be~~
490 ~~monitored for a minimum 13 consecutive weeks. If this monitoring results in recorded exposures in excess of~~
491 ~~25% of the applicable specified~~
492 ~~quarterly limit in rule 205 (e.g. 300 mrems lens of the eye, 6.25 rems hands), the auxiliary dosimeter shall~~
493 ~~be permanently assigned to monitor that area.~~

494

495 (2) Each registrant shall ensure that individuals who are required to monitor occupational doses in
496 accordance with rule 222(1) wear individual monitoring devices as follows:

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

500 (b) An individual monitoring device used for monitoring the dose to an embryo/fetus of a declared
501 pregnant woman, pursuant to rule 208, shall be located at the waist under any protective apron being
502 worn by the woman.

503 (c) An individual monitoring device used for monitoring the lens dose equivalent, to demonstrate
504 compliance with rule 205(1)(b)(i), shall be located at the neck (collar), outside any protective apron being
505 worn by the monitored individual, or at an unshielded location closer to the eye.

506 (d) An individual monitoring device used for monitoring the dose to the extremities, to demonstrate
507 compliance with rule 205(1)(b)(ii), shall be worn on the extremity likely to receive the highest exposure.

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508 | Each individual monitoring device shall be oriented to measure the highest dose to the extremity being
509 | monitored.

510

Modified monitoring location rules according to Sec. D.503 of the suggested state regulations.

511

512 | [~~Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance~~
513 | ~~are under the purview of the Michigan Department of Consumer & Industry Services.]~~

514

515 | (3) All personnel dosimeters, except for direct and indirect reading pocket ionization chambers and
516 | those dosimeters used to measure the dose to any extremity, that require processing to determine the
517 | radiation dose and that are used by registrants to comply with rule 205, with other applicable provisions of
518 | these regulations, or with specified registration conditions shall be processed and evaluated by a
519 | dosimetry processor:

520 | (a) Holding current personnel dosimetry accreditation from the national voluntary laboratory
521 | accreditation program of the national institute of standards and technology.

522 | (b) Approved in this accreditation process for the type of radiation or radiations included in the
523 | national voluntary laboratory accreditation program that most closely approximates the type of radiation
524 | or radiations for which the individual wearing the dosimeter is monitored.

525

526 | (4) The registrant shall ensure that adequate precautions are taken to prevent a deceptive exposure
527 | of an individual monitoring device.

528

Additional monitoring improvements taken from Sec. D.501(c and d) of the suggested state regulations.
The following old rules are being deleted and replaced entirely by the equivalent updated SSRCR rules in
order to improve organization consistency with the national standards:

529

530 | ~~**R325.5224. Caution signs, labels, and signals.**~~

531

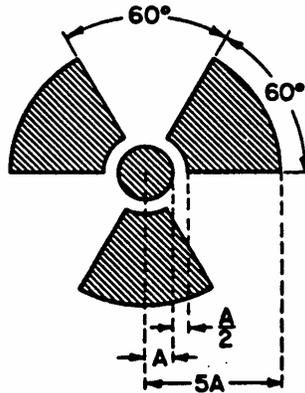
532 | ~~**Rule 224. (1)** Except as otherwise authorized by the department, symbols prescribed by rules 224 to 232~~
533 | ~~shall use the conventional radiation caution colors (magenta or purple on yellow background). The symbol~~
534 | ~~prescribed is the conventional three-bladed design:~~

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RADIATION SYMBOL



- _____ 1. _____ Cross-hatched area is to be magenta or purple.
- _____ 2. _____ Background is to be yellow.

_____ (2) _____ In addition to the contents of signs and labels prescribed in rules 224 to 232, a licensee or registrant may provide on or near these signs and labels any additional information which may be appropriate in aiding individuals to minimize being exposed to radiation.

R325.5225. Radiation area signs.

Rule 225. (1) Each radiation area shall be conspicuously posted with 1 or more signs bearing the radiation caution symbol and the words: "CAUTION, RADIATION AREA"

R325.5226. High radiation area signs.

Rule 226. (2) Each high radiation area shall be conspicuously posted with 1 or more signs bearing the radiation caution symbol and the words: "CAUTION, HIGH RADIATION AREA" OR "DANGER, HIGH RADIATION AREA"

(3) Each very high radiation area shall be conspicuously posted with 1 or more signs bearing the radiation symbol and the words: "DANGER, VERY HIGH RADIATION AREA."

R325.5227. Controls for access to high radiation areas.

Rule 227. (1) Each entrance or access point to a high radiation area shall be equipped with a control device which complies with any 1 of the following:

- (a) It causes the level of radiation to be reduced below that at which an individual might receive a dose of 100 millirems (1 MSV) in 1 hour upon entry into the area.
- (b) It energizes a conspicuous visible and audible alarm signal in such a manner that the individual entering the high radiation area and the licensee, registrant or a supervisor of the activity are made aware of the entry.
- (c) It is locked except during periods when access to the area is required, with positive control over each individual entry.

(2) These controls shall be established in such a way that an individual will not be prevented from leaving a high radiation area.

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581
582 ~~(3) The controls required by subrule (1) (a) shall be constructed in such a manner that the primary~~
583 ~~radiation cannot be reactivated until all entrances have been secured, and the radiation on-off control is reset~~
584 ~~at the control panel.~~

585
586 ~~(4) The controls required by subrule (1) (b) shall be constructed in such a manner that when the warning~~
587 ~~device is activated, it is necessary to shut off or secure the source of radiation and secure all tripped entrances~~
588 ~~before being able to inactivate the alarm system.~~

589
590 ~~(5) In the case of a high radiation area established for a period of 30 days or less, direct OR~~
591 ~~ELECTRONIC surveillance to prevent unauthorized entry may be substituted for the controls required by this~~
592 ~~rule.~~

593
594 ~~(6) A licensee, or registrant, or applicant for a license or registration, may apply to the department for~~
595 ~~approval of methods not included in subrules (1) and (5) for controlling access to high radiation areas. The~~
596 ~~department may approve the proposed alternatives if the licensee, registrant or applicant demonstrates that~~
597 ~~the alternative methods of control will prevent unauthorized entry into a high radiation area, and that the~~
598 ~~requirement of subrule (2) is met.~~

599
600
601 **R325.5231. — Alternate wording for warning signs.**

602
603 **Rule 231.**— The word DANGER may be used instead of CAUTION in a warning sign required by rules
604 225, 226, 228, 229 and 230.

This item is addressed in the new wording in Rule 225 above.

605
606 **R325.5232. — Radiation machine labels.**

607
608 **Rule 232.**— All radiation machines shall be labeled in a manner which cautions individuals that radiation is
609 produced when the machine is being operated.

610
611 **R325.5233. — Exemptions from posting and labeling requirements.**

612
613 **Rule 233.**— Notwithstanding rules 225 to 230,;

614 **(a)** A room or area is not required to be posted with a caution sign because of the presence of a sealed
615 source, if the radiation level 30 centimeters (12 inches) from the surface of the source container or housing
616 does not exceed 5 millirems per hour.

617 **(b)** A room or other area in a hospital is not required to be posted with a caution sign, and control of
618 entrance or access thereto pursuant to rule 227 is not required, because of the presence of patients
619 containing radioactive material provided the licensee or registrant has demonstrated by survey or monitoring
620 that any individual who enters this area is not likely to receive a dose in excess of the applicable limit
621 specified in rule 205.

622 **(c)** A room or other area containing radioactive material for periods of less than 8 hours is not required to
623 be posted with a caution sign if:

624 **(i)** — The material is constantly attended during these periods by an individual who shall take the
625 precautions necessary to prevent any individual from being exposed to radiation or radioactive material in
626 excess of the limits established in this part.

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

628 **(d)** A room or other area is not required to be posted with a caution sign, and control is not required for
629 each entrance or access point to a room or other area which is a high radiation area, solely because of the
630 presence of radioactive material prepared for transport and packaged and labeled in accordance with
631 regulations of the United States department of transportation.

632 **(e)** a room or other area is not required to be posted with a caution sign, and control is not required for
633 each entrance or access point to a room or other area which is a high radiation area, solely because of the
634 operation of a radiation machine during intentional irradiation of a patient if:

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635 (i) ~~_____~~ The radiation machine is constantly attended during these periods by an individual who shall
636 take the precautions necessary to prevent any individual from being exposed to radiation in excess of the
637 limits established in this part.

638 (ii) ~~The room or area is subject to the licensee's or registrant's control.~~
639

640 ~~[Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance
641 are under the purview of the Michigan Department of Consumer & Industry Services.]~~
642

643 ~~R325.5241. Use of safety equipment.~~

644 ~~**Rule 241. (1)** The existence in these rules of requirements for safety interlocks, protective enclosures,
645 protective clothing, precautionary labels, or any other safety equipment presumes the proper use of such
646 equipment. Unauthorized override of safety interlocks or other intentional misuse or non-use of required
647 safety equipment shall be considered willful violation of these rules.~~
648

649 ~~(2) Authorized override of safety interlocks shall be requested by the radiation protection supervisor in
650 writing from the department. The request shall include justification, precautionary procedures during override,
651 and statement of immediate supervision by the radiation protection supervisor or his authorized representative.
652 Prior approval by the department is required. Such approval may be granted by written condition on the
653 specific license or registration certificate or by telephone followed by written confirmation from the department.~~
654

655 ~~RECORDS, REPORTS AND NOTIFICATION~~

656 ~~R325.5245. Records of surveys, radiation monitoring, disposal and tests.~~

657 ~~**Rule 245. (1)** A licensee or registrant shall maintain records showing the radiation doses of all individuals
658 for whom personnel monitoring is required under rule 222. These records shall be kept on department Form
659 RHBHS/HFS-102, in accordance with the instructions contained in that form, or on clear and legible records
660 containing all the information required by Form RHBHS/HFS-102. The doses entered on the forms or records
661 shall be for periods of time not exceeding 1 calendar quarter.~~
662

663 ~~(2) A licensee or registrant shall maintain records in the same units used in this part, showing the results
664 of surveys required in rule 221, disposals made under rules 238 to 240, and surveys required by other parts of
665 these rules.~~
666

667 ~~(3) Records of individual exposure to radiation and to radioactive material which shall be maintained
668 pursuant to subrule (1) and records of bio-assays, including results of whole body counting examinations,
669 made pursuant to rule 209 shall be preserved indefinitely or until the department authorizes their disposal.~~
670

671 ~~(4) The discontinuance of or curtailment of activities, does not relieve the licensee or registrant of
672 responsibility for retaining all records required by this rule. A licensee or registrant may, however, request the
673 department to accept such records. The acceptance of the records by the department relieves the licensee or
674 registrant of subsequent responsibility only in respect to their preservation as required by this rule.~~
675

676 ~~(5) Records which shall be maintained pursuant to this part may be maintained in the form of microfilms.~~
677

678 ~~[Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance
679 are under the purview of the Michigan Department of Consumer & Industry Services.]~~
680

681 ~~[Note: As a result of Executive Orders 1996-1 and 1996-2, the authority, powers, duties, functions, and
682 responsibilities of the radiation machine registration, licensing, and compliance program were transferred to
683 the Michigan Department of Consumer & Industry Services. The Department of Consumer & Industry
684 Services has renamed Form RH-102 to BHS/HFS-102.]~~
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~~R325.5246. — Reports of theft or loss of sources of radiation.~~

~~Rule 246. — A licensee or registrant shall report by telephone and telegraph to the department the theft or loss of any source of radiation immediately after such occurrence becomes known to the licensee or registrant.~~

~~R325.5247. — Notification of incidents.~~

~~Rule 247. (1) A licensee or registrant shall immediately notify the department by telephone and telegraph of any incident involving any source of radiation possessed by him and which may have caused or threatens to cause any of the following:~~

~~(a) A a dose to the whole body of any individual of 25 rems or more of radiation; a dose to the skin of the whole body of any individual of 150 rems or more of radiation; or a dose to the feet, ankles, hands or forearms of any individual of 375 rems or more of radiation.~~

~~(b) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limits specified for such materials in table II of rules 261 to 269.~~

~~(c) A loss of 1 working week or more of the operation of any facilities affected due to contamination or other potential hazard from radioactive material.~~

~~(d) Damage to property in excess of \$100,000.~~

~~(e) Accidental administration of a radiopharmaceutical to a human patient in excess of the quantity established as appropriate for the procedure at hand.~~

~~(f) Accidental administration of a radiopharmaceutical to a human patient in chemical form different from that established as appropriate for the procedure at hand.~~

~~(2) — A licensee or registrant shall within 24 hours notify the department by telephone and telegraph of any incident involving any source of radiation possessed by him and which may have caused or threatens to cause any of the following:~~

~~(a) A a dose to the whole body of any individual of 5 rems or more of radiation; a dose to the skin of the whole body of any individual of 30 rems or more of radiation; or a dose to the feet, ankles, hands or forearms of 75 rems or more of radiation.~~

~~(b) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified for such materials in table II of rules 261 to 269.~~

~~(c) A loss of 1 day or more of the operation of any facilities affected or damage to property in excess of \$1,000 due to contamination or other potential hazard from radioactive material.~~

~~(3) — A report filed with the department pursuant to this rule shall be prepared in such a manner that names of individuals who have received exposure to radiation shall be stated in a separate part of the report.~~

~~[Note: — The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.]~~

~~R325.5250. — Reports of overdose and excessive levels and concentrations.~~

~~Rule 250. (1) In addition to any notification required by rule 247 a licensee or registrant shall report , in writing, within 30 days to the department:~~

~~(a) Each radiation dose received by an individual or concentrations of radioactive material in excess of any applicable limit as set forth in this part or as otherwise approved by the department.~~

~~(b) Each incident for which notification is required by rule 247.~~

~~(c) Levels of radiation or concentrations of radioactive material (not involving excessive exposure of any individual) in an unrestricted area in excess of 10 times any applicable limit as set forth in this part or as otherwise approved by the department.~~

~~(2) — A report required in subrule (1) shall describe the extent of radiation dose received by individuals or exposure to radioactive material, including estimates of each individual's dose as required by subrule (3);~~

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745 ~~levels of radiation and concentrations of radioactive material involved; the cause of exposure, levels of~~
746 ~~concentrations; and corrective steps taken or planned to assure against a recurrence.~~

747
748 ~~(3)A report filed with the department pursuant to subrule (1) shall include for each individual exposed the~~
749 ~~name, social security number, and date of birth, and an estimate of the individual's dose. The report shall be~~
750 ~~prepared so that this information is stated in a separate part of the report.~~

751
752

753 CONTROL OF EXPOSURE FROM EXTERNAL SOURCES IN RESTRICTED AREAS

754

755 R325.5224. Control of access to high radiation areas.

756

757 Rule 224. (1) The registrant shall ensure that each entrance or access point to a high radiation area has
758 one or more of the following features:

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

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

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

766

767 (2) In place of the controls required by rule 224(1), for a high radiation area, the registrant may substitute
768 continuous direct or electronic surveillance that is capable of preventing unauthorized entry.

769

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770 (3) The registrant may apply to the department for approval of alternative methods for controlling access
771 to high radiation areas.

772
773 (4) The registrant shall establish the controls required by rules 224(1) and 224(3) in a way that does not
774 prevent individuals from leaving a high radiation area.

775
776 (5) The registrant is not required to control entrance or access to rooms or other areas containing
777 radiation machines capable of producing a very high radiation area as described in this rule if specific
778 requirements for access and control are specified in other applicable parts of these regulations, such as, part 5
779 for industrial radiography, part 7 for x- rays in the healing arts, and part 10 for particle accelerators.

780
781 **R325.5225. Control of access to very high radiation areas.**

782
783 **Rule 225. (1) In addition to the requirements in rule 224, the registrant shall institute measures to ensure**
784 **that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could**
785 **be encountered at 5 Gy (500 rad) or more in 1 hour at 1 meter from a source of radiation or any surface**
786 **through which the radiation penetrates. This requirement does not apply to rooms or areas in which diagnostic**
787 **x-ray systems are the only source of radiation, or to non-self-shielded irradiators.**

788
789 (2) The registrant is not required to control entrance or access to rooms or other areas containing sources
790 of radiation capable of producing a very high radiation area as described in rule 225(1) if the registrant has met
791 all the specific requirements for access and control specified in other applicable parts of these regulations.

792
793 **R325.5226. Control of access to very high radiation areas -- irradiators.**

794
795 **Rule 226. (1) This rule applies to registrants with sources of radiation in non-self-shielded irradiators. this**
796 **rule does not apply to sources of radiation that are used in teletherapy, in industrial radiography, or in**
797 **completely self-shielded irradiators in which the source of radiation is both stored and operated within the**

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798 same shielding radiation barrier and, in the designed configuration of the irradiator, is always physically
799 inaccessible to any individual and cannot create high levels of radiation in an area that is accessible to any
800 individual.

801
802 **(2)** Each area in which there may exist radiation levels in excess of 5 gray (500 rad) in 1 hour at 1 meter
803 from a source of radiation that is used to irradiate materials shall meet the following requirements:

804 **(a)** Each entrance or access point shall be equipped with entry control devices which meet each of the
805 following:

806 **(i)** Function automatically to prevent any individual from inadvertently entering a very high
807 radiation area.

808 **(ii)** Permit deliberate entry into the area only after a control device is actuated that causes the
809 radiation level within the area, from the source of radiation, to be reduced below that at which it would be
810 possible for an individual to receive a deep dose equivalent in excess of 1 millisievert (0.1 rem) in 1 hour.

811 **(iii)** Prevent operation of the source of radiation if it would produce radiation levels in the area that
812 could result in a deep dose equivalent to an individual in excess of 1 millisievert (0.1 rem) in 1 hour.

813 **(b)** Additional control devices shall be provided so that, upon failure of the entry control devices to
814 function as required by rule 226(2)(a):

815 **(i)** The radiation level within the area, from the source of radiation, is reduced below that at
816 which it would be possible for an individual to receive a deep dose equivalent in excess of 1 millisievert
817 (0.1 rem) in 1 hour.

818 **(ii)** Conspicuous visible and audible alarm signals are generated to make an individual attempting
819 to enter the area aware of the hazard and at least one other authorized individual, who is physically
820 present, familiar with the activity, and prepared to render or summon assistance, aware of the failure of
821 the entry control devices.

822 **(c)** The registrant shall provide control devices so that, upon failure or removal of physical radiation
823 barriers other than the sealed source's shielded storage container:

824 **(i)** The radiation level from the source of radiation is reduced below that at which it would be
825 possible for an individual to receive a deep dose equivalent in excess of 1 millisievert (0.1 rem) in 1 hour.

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826 (ii) Conspicuous visible and audible alarm signals are generated to make potentially affected
827 individuals aware of the hazard and the registrant or at least one other individual, who is familiar with the
828 activity and prepared to render or summon assistance, aware of the failure or removal of the physical
829 barrier.

830 (d) Physical radiation barriers that comprise permanent structural components, such as walls, that have
831 no credible probability of failure or removal in ordinary circumstances need not meet the requirements of rule
832 226(2)(c).

833 (e) Each area shall be equipped with devices that will automatically generate conspicuous visible and
834 audible alarm signals to alert personnel in the area before the source of radiation can be put into operation
835 and in time for any individual in the area to operate a clearly identified control device, which must be
836 installed in the area and which can prevent the source of radiation from being put into operation.

837 (f) Each area shall be controlled by use of such administrative procedures and such devices as are
838 necessary to ensure that the area is cleared of personnel prior to each use of the source of radiation.

839 (g) Each area shall be checked by a radiation measurement to ensure that, prior to the first individual's
840 entry into the area after any use of the source of radiation, the radiation level from the source of radiation in
841 the area is below that at which it would be possible for an individual to receive a deep dose equivalent in
842 excess of 1 millisievert (0.1 rem) in 1 hour.

843 (h) The entry control devices required in rule 226(2)(a) shall be tested for proper functioning. see rule 245
844 for recordkeeping requirements.

845 (i) Testing shall be conducted prior to initial operation with the source of radiation on any day,
846 unless operations were continued uninterrupted from the previous day.

847 (ii) Testing shall be conducted prior to resumption of operation of the source of radiation after any
848 unintentional interruption; and

849 (iii) The registrant shall submit and adhere to a schedule for periodic tests of the entry control and
850 warning systems.

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

853 (j) Entry and exit portals that are used in transporting materials to and from the irradiation area, and that

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854 are not intended for use by individuals, shall be controlled by such devices and administrative procedures as
855 are necessary to physically protect and warn against inadvertent entry by any individual through these
856 portals.

857
858 **(3)** Registrants, or applicants for registrations for sources of radiation within the purview of rule 226(2),
859 which will be used in a variety of positions or in locations, such as open fields or forests, that make it
860 impracticable to comply with certain requirements of rule 226(2), such as those for the automatic control of
861 radiation levels, may apply to the department for approval of alternative safety measures. Alternative safety
862 measures shall provide personnel protection at least equivalent to those specified in rule 226(2). At least one
863 of the alternative measures shall include an entry-preventing interlock control based on a measurement of the
864 radiation that ensures the absence of high radiation levels before an individual can gain access to the area
865 where such sources of radiation are used.

866
867 **(4)** The entry control devices required by rules 226(2 and 3) shall be established in such a way that no
868 individual will be prevented from leaving the area.

869

870 **STORAGE AND CONTROL OF RADIATION MACHINES**

871

872 **R325.5227. Security and control of radiation machines.**

873

874 **Rule 227. (1)** The registrant shall secure radiation machines from unauthorized removal or access.

875

876 **(2)** The registrant shall maintain constant surveillance, and use devices or administrative procedures to
877 prevent unauthorized use of radiation machines that are in unrestricted areas and that are not in storage.

878

879 **(3)** The registrant shall use devices or administrative procedures to prevent unauthorized use of radiation
880 machines.

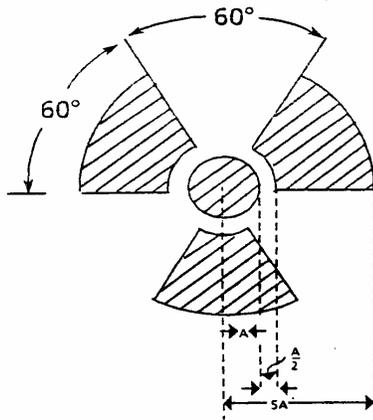
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PRECAUTIONARY PROCEDURES

R325.5228. Caution signs.

Rule 228. (1) Standard radiation symbol. Unless otherwise authorized by the department, the symbol prescribed by rule 228 shall use the colors magenta, or purple, or black on yellow background. the symbol prescribed is the three-bladed design as follows:



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

Figure 1. Radiation Symbol.

(2) Additional information on signs and labels. In addition to the contents of signs and labels prescribed in part 4, the registrant may provide, on or near the required signs and labels, additional information, as appropriate, to make individuals aware of potential radiation exposures and to minimize the exposures.

R325.5229. Posting requirements.

Rule 229. (1) Posting of Radiation Areas. The registrant shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA."

(2) Posting of High Radiation Areas. The registrant shall post each high radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, HIGH RADIATION AREA"

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921 or "DANGER, HIGH RADIATION AREA."

922

923 (3) Posting of Very High Radiation Areas. The registrant shall post each very high radiation area with a
924 conspicuous sign or signs bearing the radiation symbol and words "GRAVE DANGER[not required to use the
925 word GRAVE , this may be omitted], VERY HIGH RADIATION AREA."

926

927 **R325.5230. Exceptions to posting requirements.**

928

929 **Rule 230. (1) A registrant is not required to post caution signs in areas or rooms containing radiation**
930 machines for periods of less than 8 hours, if each of the following conditions is met:

931 (a) The radiation machines are constantly attended during these periods by an individual who takes the
932 precautions necessary to prevent the exposure of individuals to radiation in excess of the limits established
933 in Part 4.

934 (b) The area or room is subject to the registrant's control.

935

936 (2) A room or area is not required to be posted with a caution sign because of the presence of radiation
937 machines used solely for diagnosis in the healing arts.

938

939 **R325.5231. Labeling radiation machines.**

940

941 **Rule 231. (1) Each registrant shall ensure that each radiation machine is labeled in a conspicuous manner,**
942 which cautions individuals that radiation is produced when it is energized.

943

944 **RECORDS**

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946 **R325.5240. General provisions.**

947

948 **Rule 240. (1) Each registrant shall use the SI units , gray, sievert and coulomb per kilogram, or the special**

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949 units rad, rem and roentgen, including multiples and subdivisions, and shall clearly indicate the units of all
950 quantities on records required by Part 4.

951
952 (2) The registrant shall make a clear distinction among the quantities entered on the records required by
953 Part 4, such as, total effective dose equivalent shallow dose equivalent, lens dose equivalent, deep dose
954 equivalent, or committed effective dose equivalent.

955
956 **R325.5241. Records of radiation protection programs.**

957
958 **Rule 241. (1) Each registrant shall maintain records of the radiation protection program, including:**

- 959 (a) The provisions of the program; and
960 (b) Audits and other reviews of program content and implementation.

961
962 (2) The registrant shall retain the records required by rule 241(1)(a) until the department terminates each
963 pertinent registration requiring the record. The registrant shall retain the records required by rule 241(1)(b) for
964 3 years after the record is made.

965
966 **R325.5242. Records of surveys.**

967
968 **Rule 242. (1) Each registrant shall maintain records showing the results of surveys and calibrations required**

969 by rule 221. The registrant shall retain these records for 3 years after the record is made.

970
971 (2) The registrant shall retain the following records until the department terminates each pertinent
972 registration requiring the record:

973
974 Records of the results of surveys to determine the dose from external sources of radiation used, in the
975 absence of or in combination with individual monitoring data, in the assessment of individual dose
976 equivalents.

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R325.5243. Records of individual monitoring results.

Rule 243. (1) Recordkeeping Requirement. Each registrant shall maintain records of doses received by all individuals for whom monitoring was required pursuant to rule 222, and records of doses received during, accidents, and emergency conditions. Assessments of dose equivalent and records made using units in effect before **[the effective date of Part 4]** need not be changed. These records shall include, when applicable:

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

(2) Recordkeeping Frequency. The registrant shall make entries of the records specified in rule 243(1) at intervals not to exceed 1 year.

(3) Recordkeeping Format. The registrant shall maintain the records specified in rule 243(1) on Form BHS/HFS-102, in accordance with the instructions for Form BHS/HFS-102, or in clear and legible records containing all the information required by Form BHS/HFS-102.

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

(5) The registrant shall retain each required form or record until the department terminates each pertinent registration requiring the record.

(6) Upon termination of the registration, the registrant shall permanently store records on Form BHS/HFS-101 or equivalent, or shall make provision with the department for transfer to the department.

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1005 **R325.5244. Records of dose to individual members of the public.**

1006

1007 **Rule 244. (1) Each registrant shall maintain records sufficient to demonstrate compliance with the dose limit**
1008 **for individual members of the public. See Rule 210.**

1009

1010 **(2) The registrant shall retain the records required by rule 244(1) until the department terminates each**
1011 **pertinent registration requiring the record.**

1012

1013 **R325.5245. Records of testing entry control devices for very high radiation areas.**
1014

1015 **Rule 245. (1) Each registrant shall maintain records of tests made pursuant to rule 226(2)(h) on entry**
1016 **control devices for very high radiation areas. These records must include the date, time, and results of each**
1017 **such test of function.**

1018

1019 **(2) The registrant shall retain the records required by rule 245(1) for 3 years after the record is made.**

1020

1021 **R325.5246. Form of records.**

1022

1023 **Rule 246. Each record required by Part 4 shall be legible throughout the specified retention period. The**
1024 **record shall be the original or a reproduced copy or a microform, provided that the copy or microform is**
1025 **authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout**
1026 **the required retention period or the record may also be stored in electronic media with the capability for**
1027 **producing legible, accurate, and complete records during the required retention period. Records, such as**
1028 **letters, drawings, and specifications, shall include all pertinent information, such as stamps, initials, and**
1029 **signatures. The registrant shall maintain adequate safeguards against tampering with and loss of records.**

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1031 **REPORTS**

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1033 **R325.5250. Notification of incidents.**

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Rule 250. (1) Immediate Notification. Notwithstanding other requirements for notification, each registrant shall immediately report each event involving a source of radiation possessed by the registrant that may have caused or threatens to cause an individual to receive:

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

(b) An eye dose equivalent of 0.75 sievert (75 rem) or more; or

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

(2) Twenty-Four Hour Notification. Each registrant shall, within 24 hours of discovery of the event, report to the department each event involving loss of control of a registered source of radiation possessed by the registrant that may have caused, or threatens to cause an individual to receive, in a period of 24 hours:

(a) A total effective dose equivalent exceeding 0.05 sievert (5 rem); or

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

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

(3) Registrants shall make the reports required by rule 250(1 and 2) by initial contact by telephone to the department and shall confirm the initial contact by letter, or facsimile to the department.

(4) The registrant shall prepare each report filed with the department pursuant to rule 250 so that names of individuals who have received exposure to sources of radiation are stated in a separate and detachable portion of the report.

R325.5251. Reports of exposures and radiation levels exceeding the limits.

Rule 251. (1) Reportable Events. In addition to the notification required by rule 250, each registrant shall submit a written report within 30 days after learning of any of the following occurrences:

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- 1062 (a) Incidents for which notification is required by rule 250.
- 1063 (b) Doses in excess of any of the following:
- 1064 (i) The occupational dose limits for adults in rule 205.
- 1065 (ii) The occupational dose limits for a minor in rule 207.
- 1066 (iii) The limits for an embryo/fetus of a declared pregnant woman in rule 208.
- 1067 (iv) The limits for an individual member of the public in rule 210.
- 1068 (c) Levels of radiation in:
- 1069 (i) A restricted area in excess of applicable limits in the registration.
- 1070 (ii) An unrestricted area in excess of 10 times the applicable limit set forth in Part 4 or in the
- 1071 registration, whether or not involving exposure of any individual in excess of the limits in rule 210.
- 1072
- 1073 (2) Each report required by rule 251(1) shall describe the extent of exposure of individuals to radiation
- 1074 and radiation machine, including, as appropriate:
- 1075 (a) Estimates of each individual's dose.
- 1076 (b) The levels of radiation.
- 1077 (c) The cause of the elevated exposures, dose rates.
- 1078 (d) Corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving
- 1079 conformance with applicable limits, ALARA constraints generally applicable environmental standards, and
- 1080 associated registration conditions.
- 1081
- 1082 (3) Each report filed pursuant to rule 251(1) shall include for each occupationally overexposed³ individual
- 1083 exposed: the name, Social Security account number or other unique employee identification number, and date
- 1084 of birth. With respect to the limit for the embryo/fetus in rule 208, the identifiers should be those of the
- 1085 declared pregnant woman. The report shall be prepared so that this information is stated in a separate and
- 1086 detachable portion of the report.
- 1087
- 1088 (4) All registrants who make reports pursuant to rule 251(1) shall submit the report in writing to the

³ with respect to the limit for the embryo-fetus (D.2208), the identifiers should be those of the declared pregnant woman

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1089 department.

1090

1091 **R325.5252. Reports to individuals of exceeding dose limits.**

1092

1093 **Rule 252.** When a registrant is required to report to the department any exposure of an identified
1094 occupationally exposed individual, or an identified member of the public, to radiation from a radiation machine,
1095 the registrant shall also provide a copy of the report submitted to the department to the individual. This report
1096 must be transmitted at a time no later than the transmittal to the department.

1097

1098 **R325.5253. Notifications and reports to individuals.**

1099

1100 **Rule 253. (1)** Requirements for notification and reports to individuals of exposure to radiation from a
1101 radiation machine are specified in part 3 of these regulations.

1102

1103 **(2)** When a registrant is required pursuant to rule 251 to report to the department any exposure of an
1104 individual to radiation from a radiation machine, the registrant shall also notify the individual. Such notice shall
1105 be transmitted at a time not later than the transmittal to the department, and shall comply with the provisions of
1106 part 3 of these regulations.

1107