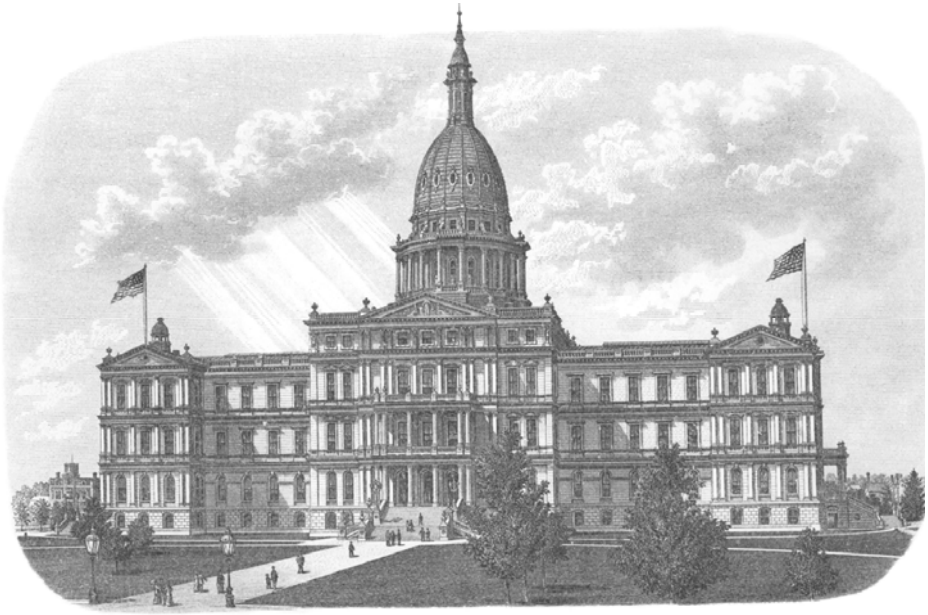
Michigan Register

Issue No. 10– 2016 (Published June 15, 2016)



GRAPHIC IMAGES IN THE

MICHIGAN REGISTER

COVER DRAWING

Michigan State Capitol:

This image, with flags flying to indicate that both chambers of the legislature are in session, may have originated as an etching based on a drawing or a photograph. The artist is unknown. The drawing predates the placement of the statue of Austin T. Blair on the capitol grounds in 1898.

(Michigan State Archives)

PAGE GRAPHICS

Capitol Dome:

The architectural rendering of the Michigan State Capitol's dome is the work of Elijah E. Myers, the building's renowned architect. Myers inked the rendering on linen in late 1871 or early 1872. Myers' fine draftsmanship, the hallmark of his work, is clearly evident.

Because of their size, few architectural renderings of the 19th century have survived. Michigan is fortunate that many of Myers' designs for the Capitol were found in the building's attic in the 1950's. As part of the state's 1987 sesquicentennial celebration, they were conserved and deposited in the Michigan State Archives.

(Michigan State Archives)

East Elevation of the Michigan State Capitol:

When Myers' drawings were discovered in the 1950's, this view of the Capitol – the one most familiar to Michigan citizens – was missing. During the building's recent restoration (1989-1992), this drawing was commissioned to recreate the architect's original rendering of the east (front) elevation.

(Michigan Capitol Committee)

Michigan Register

Published pursuant to § 24.208 of
The Michigan Compiled Laws

Issue No. 10— 2016
(This issue, published June 15, 2016, contains
documents filed from May 15, 2016 to June 1, 2016)

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Rick Snyder, Governor

Brian Calley, Lieutenant Governor

PREFACE

PUBLICATION AND CONTENTS OF THE MICHIGAN REGISTER

The Office of Regulatory Reform publishes the *Michigan Register*.

While several statutory provisions address the publication and contents of the *Michigan Register*, two are of particular importance.

24.208 Michigan register; publication; cumulative index; contents; public subscription; fee; synopsis of proposed rule or guideline; transmitting copies to office of regulatory reform.

Sec. 8.

(1) The office of regulatory reform shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:

(a) Executive orders and executive reorganization orders.

(b) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills signed into law by the governor during the calendar year and the corresponding public act numbers.

(c) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills vetoed by the governor during the calendar year.

(d) Proposed administrative rules.

(e) Notices of public hearings on proposed administrative rules.

(f) Administrative rules filed with the secretary of state.

(g) Emergency rules filed with the secretary of state.

(h) Notice of proposed and adopted agency guidelines.

(i) Other official information considered necessary or appropriate by the office of regulatory reform.

(j) Attorney general opinions.

(k) All of the items listed in section 7(m) after final approval by the certificate of need commission under section 22215 of the public health code, 1978 PA 368, MCL 333.22215.

(2) The office of regulatory reform shall publish a cumulative index for the Michigan register.

(3) The Michigan register shall be available for public subscription at a fee reasonably calculated to cover publication and distribution costs.

(4) If publication of an agency's proposed rule or guideline or an item described in subsection (1)(k) would be unreasonably expensive or lengthy, the office of regulatory reform may publish a brief synopsis of the proposed rule or guideline or item described in subsection (1)(k), including information on how to obtain a complete copy of the proposed rule or guideline or item described in subsection (1)(k) from the agency at no cost.

(5) An agency shall electronically transmit a copy of the proposed rules and notice of public hearing to the office of regulatory reform for publication in the Michigan register.

4.1203 Michigan register fund; creation; administration; expenditures; disposition of money received from sale of Michigan register and amounts paid by state agencies; use of fund; price of Michigan register; availability of text on internet; copyright or other proprietary interest; fee prohibited; definition.

Sec. 203.

(1) The Michigan register fund is created in the state treasury and shall be administered by the office of regulatory reform. The fund shall be expended only as provided in this section.

(2) The money received from the sale of the Michigan register, along with those amounts paid by state agencies pursuant to section 57 of the administrative procedures act of 1969, 1969 PA 306, MCL 24.257, shall be deposited with the state treasurer and credited to the Michigan register fund.

(3) The Michigan register fund shall be used to pay the costs of preparing, printing, and distributing the Michigan register.

(4) The department of management and budget shall sell copies of the Michigan register at a price determined by the office of regulatory reform not to exceed the cost of preparation, printing, and distribution.

(5) Notwithstanding section 204, beginning January 1, 2001, the office of regulatory reform shall make the text of the Michigan register available to the public on the internet.

(6) The information described in subsection (5) that is maintained by the office of regulatory reform shall be made available in the shortest feasible time after the information is available. The information described in subsection (5) that is not maintained by the office of regulatory reform shall be made available in the shortest feasible time after it is made available to the office of regulatory reform.

(7) Subsection (5) does not alter or relinquish any copyright or other proprietary interest or entitlement of this state relating to any of the information made available under subsection (5).

(8) The office of regulatory reform shall not charge a fee for providing the Michigan register on the internet as provided in subsection (5).

(9) As used in this section, "Michigan register" means that term as defined in section 5 of the administrative procedures act of 1969, 1969 PA 306, MCL 24.205.

CITATION TO THE MICHIGAN REGISTER

The *Michigan Register* is cited by year and issue number. For example, 2001 MR 1 refers to the year of issue (2001) and the issue number (1).

CLOSING DATES AND PUBLICATION SCHEDULE

The deadlines for submitting documents to the Office of Regulatory Reinvention for publication in the *Michigan Register* are the first and fifteenth days of each calendar month, unless the submission day falls on a Saturday, Sunday, or legal holiday, in which event the deadline is extended to include the next day which is not a Saturday, Sunday, or legal holiday. Documents filed or received after 5:00 p.m. on the closing date of a filing period will appear in the succeeding issue of the *Michigan Register*.

The Office of Regulatory Reinvention is not responsible for the editing and proofreading of documents submitted for publication.

Documents submitted for publication should be delivered or mailed in an electronic format to the following address: MICHIGAN REGISTER, Office of Regulatory Reinvention, Ottawa Building – Second Floor, 611 W. Ottawa Street, Lansing, MI 48909.

RELATIONSHIP TO THE MICHIGAN ADMINISTRATIVE CODE

The *Michigan Administrative Code* (1979 edition), which contains all permanent administrative rules in effect as of December 1979, was, during the period 1980-83, updated each calendar quarter with the publication of a paperback supplement. An annual supplement contained those permanent rules, which had appeared in the 4 quarterly supplements covering that year.

Quarterly supplements to the Code were discontinued in January 1984, and replaced by the monthly publication of permanent rules and emergency rules in the *Michigan Register*. Annual supplements have included the full text of those permanent rules that appear in the twelve monthly issues of the *Register* during a given calendar year. Emergency rules published in an issue of the *Register* are noted in the annual supplement to the Code.

SUBSCRIPTIONS AND DISTRIBUTION

The *Michigan Register*, a publication of the State of Michigan, is available for public subscription at a cost of $400.00 per year. Submit subscription requests to: Office of Regulatory Reinvention, Ottawa Building – Second Floor, 611 W. Ottawa Street, Lansing, MI 48909. Checks Payable: State of Michigan. Any questions should be directed to the Office of Regulatory Reinvention (517) 335-8658.

INTERNET ACCESS

The *Michigan Register* can be viewed free of charge on the Internet web site of the Office of Regulatory Reinvention: www.michigan.gov/orr.

Issue 2000-3 and all subsequent editions of the *Michigan Register* can be viewed on the Office of Regulatory Reinvention Internet web site. The electronic version of the *Register* can be navigated using the blue highlighted links found in the Contents section. Clicking on a highlighted title will take the reader to related text, clicking on a highlighted header above the text will return the reader to the Contents section.

Mike Zimmer, Director
Licensing and Regulatory Affairs

2016 PUBLICATION SCHEDULE

Issue No.	Closing Date for Filing or Submission Of Documents (5 p.m.)	Publication Date
1	January 15, 2016	February 1, 2016
2	February 1, 2016	February 15, 2016
3	February 15, 2016	March 1, 2016
4	March 1, 2016	March 15, 2016
5	March 15, 2016	April 1, 2016
6	April 1, 2016	April 15, 2016
7	April 15, 2016	May 1, 2016
8	May 1, 2016	May 15, 2016
9	May 15, 2016	June 1, 2016
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18	October 1, 2016	October 15, 2016
19	October 15, 2016	November 1, 2016
20	November 1, 2016	November 15, 2016
21	November 15, 2016	December 1, 2016
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23	December 15, 2016	January 1, 2017
24	January 1, 2017	January 15, 2017

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ADMINISTRATIVE RULES
FILED WITH THE SECRETARY OF STATE

MCL 24.208 states in part:

"Sec. 8. (1) The Office of Regulatory Reinvention shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:

* * *

(f) Administrative rules filed with the secretary of state."

ADMINISTRATIVE RULES

DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

STATE FIRE SAFETY BOARD

NEW AND EXISTING SCHOOL, COLLEGE, AND UNIVERSITY FIRE SAFETY

Filed with the Secretary of State on May 19, 2016

These rules become effective 30 days after filling with the Secretary of State.

(By authority conferred on the bureau of fire services by section 3c of 1941 PA 207, MCL 29.3c, and Executive Reorganization Order Nos. 1997-2, 1998-2 and 2003-1, MCL 29.451, 29.461, and 445.2011)

R 29.1901, R 29.1902, R 29.1903, R 29.1904, R 29.1905, R 29.1906, R 29.1907, R 29.1908, R 29.1921, R 29.1922, R 29.1923, R 29.1924, R 29.1931, R 29.1932, R 29.1933, and R 29.1934 of the Michigan Administrative Code are amended; R 29.1907a is added; and, R 29.1909 is rescinded as follows:

PART 1. GENERAL PROVISIONS

R 29.1901 Applicability.
Rule 1. These rules apply to all new and existing school, college, and university facilities used for instructional purposes as defined by these rules.

R 29.1902 Life safety code; adoption by reference.
Rule 2. (1) The provisions of chapters 1 to 10, 11, 12, 13, 14, 15, 38, 39, and 43 of the national fire protection association pamphlet no. 101, 2012 edition, entitled "Life Safety Code," referred to in these rules as “code”, are adopted by reference as part of these rules.
(2) Copies of the adopted provisions in subrules (1) and (3) of this rule are available for inspection and distribution from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, Massachusetts 02269-9101, telephone number 1-800-344-3555 or as otherwise specified in subrule (3) of this rule. The cost of the adopted provisions of the "Life Safety Code" as of the time of adoption of these rules is $93.00. The cost of the adopted provisions in subrule (3) of this rule are specified in subrule (3) of this rule. Copies of the adopted provisions are available for inspection at the offices of the Department of Licensing and Regulatory Affairs, Bureau of Fire Services, 3101 Technology Boulevard, Suite H, Lansing, MI 48910, or as specified in this rule. Copies of the adopted provisions may be purchased from the bureau of fire services at cost from any national source identified in chapter 2 of the code as amended in subrules (1) and (3) of this rule plus $30.00 for shipping and handling as of the time of the adoption of these rules.
(3) Chapter 2 of the code is amended to read as follows:

2.1 General. The documents or portions thereof listed in this chapter are referenced within this code and shall be considered part of the requirements of this document. The cost of each standard at the time of the adoption of these rules is indicated after the title.

2.2 NFPA Publications. www.nfpa.org

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471

NFPA 10, Standard for Portable Fire Extinguishers, 2010 edition. $44.50/each

NFPA 11, Standard for Low-, Medium-, and High-Expansion Foam, 2010 edition. $44.50/each

NFPA 12, Standard on Carbon Dioxide Extinguishing Systems, 2011 edition. $44.50/each

NFPA 12A, Standard on Halon 1301 Fire Extinguishing Systems, 2009 edition. $44.50/each

NFPA 13, Standard for the Installation of Sprinkler Systems, 2010 edition. $85.50/each

NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, 2010 edition. $44.50/each

NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, 2010 edition. $40.50/each

NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 2010 edition. $40.50/each

NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection, 2012 edition. $44.50/each

NFPA 16, Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems, 2011 edition. $40.50/each

NFPA 17, Standard for Dry Chemical Extinguishing Systems, 2009 edition. $40.50/each

NFPA 17A, Standard for Wet Chemical Extinguishing Systems, 2009 edition. $35.00/each

NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2011 edition. $52.50/each

NFPA 30, Flammable and Combustible Liquids Code, 2012 edition. References to this standard mean R 29.5401 to R29. 5419, promulgated by the Michigan department of licensing and regulatory affairs, bureau of fire services.

NFPA 30B, Code for the Manufacture and Storage of Aerosol Products, 2011 edition. $44.50/each

NFPA 31, Standard for the Installation of Oil-Burning Equipment, 2011 edition. $44.50/each

NFPA 40, Standard for the Storage and Handling of Cellulose Nitrate Film, 2011 edition. $35.00/each

NFPA 45, Standard on Fire Protection for Laboratories Using Chemicals, 2011 edition. $40.50/each

NFPA 54, National Fuel Gas Code, 2012 edition. $52.50/each

NFPA 58, Liquefied Petroleum Gas Code, 2011 edition. References to this code mean the administrative rules relating to storage and handling of liquefied petroleum gases, R 29.6001 to R 29.6097, promulgated by the Michigan department of licensing and regulatory affairs, bureau of fire services.

NFPA 70, National Electrical Code, 2011 edition. References to this code mean the Michigan electrical code, R 408.30801 to R 408.30880, promulgated by the Michigan department of licensing and regulatory affairs, bureau of construction codes.

NFPA 72, National Fire Alarm Code, 2010 edition. $85.50/each

NFPA 80, Standard for Fire Doors and Fire Windows, 2010 edition. $44.50/each

NFPA 82, Standard on Incinerators and Waste and Linen Handling Systems and Equipment, 2009 edition. $40.50/each

NFPA 88A, Standard for Parking Structures, 2011 edition. $35.00/each

NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, 2012 edition. $40.50/each
NFPA 90B, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems, 2012 edition. $35.00/each
NFPA 91, Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids, 2010 edition. $35.00/each
NFPA 92, Standard for Smoke Control Systems, 2012 edition. $40.50/each
NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, 2011 edition. $40.50/each
NFPA 99, Standard for Health Care Facilities, 2012 edition. $64.00/each
NFPA 101A, Guide on Alternative Approaches to Life Safety, 2010 edition. $44.50/each
NFPA 105, Standard for the Installation of Smoke Door Assemblies, 2010 edition. $35.00/each
NFPA 110, Standard for Emergency and Standby Power Systems, 2010 edition. $39.00/each
NFPA 111, Standard on Stored Electrical Energy Emergency and Standby Power Systems, 2010 edition. $40.50/each
NFPA 160, Standard for the Use of Flame Effects Before an Audience, 2011 edition. $40.50/each
NFPA 170, Standard for Fire Safety and Emergency Symbols, 2009 edition. $44.50/each
NFPA 204, Standard for Smoke and Heat Venting, 2012 edition. $44.50/each
NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances, 2010 edition. $44.50/each
NFPA 220, Standard on Types of Building Construction, 2012 edition. $35.00/each
NFPA 221, Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls, 2010 edition. $40.50/each
NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2009 edition. $40.50/each
NFPA 251, Standard Methods of Tests of Fire Resistance of Building Construction and Materials, 2006 edition. $40.50/each
NFPA 252, Standard Methods of Fire Tests of Door Assemblies, 2008 edition. $35.00/each
NFPA 253, Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source, 2011 edition. $35.00/each
NFPA 257, Standard on Fire Test for Window and Glass Block Assemblies, 2007 edition. $35.00/each
NFPA 259, Standard Test Method for Potential Heat of Building Materials, 2008 edition.$35.00/each
NFPA 260, Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture, 2009 edition. $35.00/each
NFPA 261, Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes, 2009 edition. $35.00/each
NFPA 265, Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls, 2011 edition. $40.50/each
NFPA 271, Standard Method of Test for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter, 2009 edition. $40.50/each
NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth, 2011 edition. $40.50/each
NFPA 288, Standard Methods of Fire Tests of Floor Fire Door Assemblies Installed Horizontally in Fire Resistance-Rated Floor Systems, 2007 edition. $35.00/each

NFPA 289, Standard Method of Fire Test for Individual Fuel Packages, 2009 edition. $35.00/each
NFPA 415, Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways, 2008 edition. $35.00/each
NFPA 418, Standard for Heliports, 2011 edition. $35.00/each
NFPA 701, Standard Methods of Fire Tests for Flame Propagation of Textiles and Films, 2010 edition. $35.00/each
NFPA 703, Standard for Fire Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials, 2012 edition. $35.00/each
NFPA 720, Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment, 2012 edition. $44.50/each
NFPA 750, Standard on Water Mist Fire Protection Systems, 2010 edition. $44.50/each
NFPA 914, Code for Fire Protection of Historic Structures, 2010 edition. $64.00/each
NFPA 1124, Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic Articles, 2006 edition. $44.50/each
NFPA 1126, Standard for the Use of Pyrotechnics Before a Proximate Audience, 2011 edition. $35.00/each
NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems, 2012 edition. $52.50/each

2.3 Other Publications.
2.3.1 ACI Publication. www.concrete.org
American Concrete Institute, P. O. Box 9094, Farmington Hills, MI 48333
ACI 216.1/TMS 0216.1, Standard Method for Determining Fire Resistance of Concrete and Masonry Construction Assemblies, 2008. $54.50/each
2.3.2 ANSI Publications.
American National Standards Institute, Inc., 25 West 43rd Street, 4th floor, New York, NY 10036.
ANSI A14.3, Safety Requirements for Fixed Ladders, 1992. www.ansi.org $250.00/each
ICC/ANSI A117.1, American National Standard for Accessible and Usable Buildings and Facilities, 2009. www.ansi.org $63.95/each
ANSI/BHMA A156.3 Exit Devices, 2008. www.ansi.org $36.00/each
BHMA/ANSI A156.19, American National Standard for Power Assist and Low Energy Power Operated Doors, 2007. www.ansi.org $36.00/each
2.3.3 ASCE Publications. American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400. www.asce.org
ASCE/SFPE 29, Standard Calculation Methods for Structural Fire Protection, 2008. $69.00/each
2.3.4 ASME Publications. www.asme.org American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990
2.3.5 ASSE Publications. American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018. www.asse.org
ANSI/ASSE A1264.1, Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems, 2007. $69.00/each
2.3.6 ASTM Publications. www.astm.org American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
ASTM C 1629/C 1629M, Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Pan Products and Fiber-Reinforced Cement Panels, 2006. $49.20/each
ASTM D 1929, Standard Test Method for Determining Ignition Temperatures of Plastic, (2001 e1). $49.20/each

ASTM D 2859, Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials, 2006. $43.20/each
ASTM D 2898, Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, 2010. $36.00/each
ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, 2010. $70.80/each
ASTM E 108, Standard Test Methods for Fire Tests of Roof Coverings, 2010a. $56.40/each
ASTM E 119, Standard Test Methods for Fire Tests of Building Construction and Materials, 2010b. $70.80/each
ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, 2009b. $56.40/each
ASTM E 648, Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source, 2010. $56.40/each
ASTM E 814, Standard Test Method for Fire Tests of Through Penetration Fire Stops, 2010. $56.40/each
ASTM E 1352, Standard Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies, 2008a. $47.00/each
ASTM E 1353, Standard Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture 2008a(e1). $47.00/each
ASTM E 1354, Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter, 2009. $56.40/each
ASTM E 1537, Standard Test Method for Fire Testing of Upholstered Furniture, 2007. $70.80/each
ASTM E 1590, Standard Test Method for Fire Testing of Mattresses, 2007. $70.80/each
ASTM E 1591, Standard Guide for Obtaining Data for Deterministic Fire Models, 2007. $47.00/each
ASTM E 1966, Standard Test Method for Fire-Resistive Joint Systems, 2007. $47.00/each
ASTM E 2072, Standard Specification for Photoluminescent (Phosphorescent) Safety Markings, 2010. $36.00/each
ASTM E 2074, Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies, 2000. $56.40/each
ASTM E 2307, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-Story Test Apparatus, 2010. $47.00/each
ASTM E 2404, Standard Practice for Specimen Preparation and Mounting of Textile, Paper, or Vinyl Wall or Ceiling Coverings to Assess Surface Burning Characteristics, 2008. $43.20/each
ASTM E 2573, Standard Practice for Specimen Preparation and Mounting of Site-Fabricated Stretch Systems to Assess Surface Burning Characteristics, 2007a. $43.20/each
ASTM E 2599, Standard Practice for Specimen Preparation and Mounting of Reflective Insulation Materials and Radiant Barrier Materials for Building Applications to Assess Surface Burning Characteristics, 2009. $43.20/each
ASTM E 2652, Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-Shaped Airflow Stabilizer, at 750 Degrees C, 2009a. $56.40/each
ASTM F 851, Standard Test Method for Self-Rising Seat Mechanisms, 1987 (2005). $36.00/each
ASTM F 1577, Standard Test Methods for Detention Locks for Swinging Doors, 2005. $70.80/each

ASTM G 155, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials, 2005a. $47.00/each
2.3.7 FMGR Publication.
FM Global Research, FM Global, 1301 Atwood Avenue, P.O. Box 7500, Johnston, RI 02919.
ANSI/FM 4880, American National Standard for Evaluating Insulated Wall or Wall and Roof/Ceiling Assemblies, Plastic Interior Finish Materials, Plastic Exterior Building Panels, Wall/Ceiling Coating Systems, Interior or Exterior Finish Systems, 2007. Free
FM Approval Standard 6921, Containers for Combustible Waste, 2004. Free
UL 300, Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment, 2005. $502.00/each at www.comm-2000.com
2.3.8 NEMA Publications. National Electrical Manufacturers Association, 1300 North 17th Street, Ste 1847, Rosslyn, VA 22209. www.nema.org
NEMA Sb 30, Fire Service Annunciator and Interface, 2005. $69.00/each
2.3.9 UL Publications. www.UL.com; purchase UL standards at www.comm-2000.com per UL website. (All revisions included in purchase of standard) Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062
ANSI/UL 9, Standard for Fire Tests of Window Assemblies, 2009. $631.00/each
ANSI/UL 10B, Standard for Fire Tests of Door Assemblies, 2008, revised 2009. $631.00/each
ANSI/UL 10C, Standard for Positive Pressure Fire Tests of Door Assemblies, 2009. $631.00/each
ANSI/UL 263, Standard for Fire Tests of Building Construction and Materials, 2007. $631.00/each
UL 294, Standard for Access Control System Unites, 1999, revised 2010. $502.00/each
UL 300A, Extinguishing System Units for Residential Range Top Cooking Surfaces, 2006. $275.00/each
ANSI/UL 305, Standard for Safety Panic Hardware, 1997. $502.00/each
ANSI/UL 555, Standard for Fire Dampers, 2006, Revised 2002. $998.00/each
ANSI/UL 555S, Standard for Smoke Dampers, 2006, Revised 2010. $502.00/each
ANSI/UL 723, Standard for Test for Surface Burning Characteristics of Building Materials, 2009, revised 2010. $631.00/each
ANSI/UL 790, Test Methods for Fire Tests of Roof Coverings, 2004, revised 2008. $502.00/each
ANSI/UL 924, Standard for Emergency Lighting and Power Equipment, 2006, Revised 2009. $998.00/each
ANSI/UL 1040, Standard for Fire Test of Insulated Wall Construction, 1996, revised 2007. $502.00/each
ANSI/UL 1315, Standard for Safety for Metal Waste Paper Containers, 2007. $502.00/each
ANSI/UL 1479, Standard for Fire Tests of Through-Penetration Firestops, 2003, revised 2010. $502.00/each
ANSI/UL 1715, Standard for Fire Test of Interior Finish Material, 1997, revised 2008. $897.00/each
ANSI/UL 1784, Standard for Air Leakage tests for Door Assemblies, 2001, revised 2009. $502.00/each
UL 1975, Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes, 2006. $998.00 each
UL 1994, Standard for Luminous Egress Path Marking Systems, 2004, revised 2010. $998.00/each

ANSI/UL 2079, Standard for Tests for Fire Resistance of Building Joint Systems, 2004, revised 2008. $502.00/each
2.3.10 U.S. Government Publication. www.access.gpo.gov
U.S. Government Printing Office, Washington, DC 20402.
Title 16, Code of Federal Regulations, Part 1500 and Part 1507. Free
Title 16, Code of Federal Regulations, Part 1632, "Standard for the Flammability of Mattresses and Mattress Pads (FF-4-72)." Free
2.3.11 Other Publication.
Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003. www.merriam-webster.com $27.95/each
2.4 References for Extracts in Mandatory Sections.
NFPA 1, Uniform Fire Code, 2012 edition. $85.50/each
NFPA 72, National Fire Alarm Code, 2010 edition. $85.50/each
NFPA 80, Standard for Fire Doors and Fire Windows, 2010 edition. $40.50/each
NFPA 88A, Standard for Parking Structures, 2011 edition. $35.00/each
NFPA 288, Standard Methods of Fire Tests of Floor Fire Door Assemblies Installed Horizontally in Fire Resistance-Rated Floor Systems, 2009 edition. $35.00/each
NFPA 301, Code for Safety to Life from Fire on Merchant Vessels, 2008 edition. $44.5.00/each
NFPA 415, Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways, 2008 edition. $35.00/each
NFPA 914, Code for Fire Protection of Historic Structures, 2010 edition. $64.00/each
NFPA 921, Guide for Fire and Explosion Investigations, 2011 edition. $85.50/each
ASCE/SEI 7, Minimum Design Loads for Buildings and Other Structures, 2010. www.asce.org $165.00.

(4) Rules promulgated by the department of licensing and regulatory affairs, bureau of fire services, are available for inspection from the Michigan government website, www.michigan.gov/orr and linking to “Michigan administrative code” and also are available from the Michigan department of licensing and regulatory affairs, bureau of fire services by calling (517) 241-8847.

(5) Rules pertaining to the Michigan elevator code, R 408.7001 to R 408.8695; the Michigan mechanical code, R 408.30901 to R408.30998; the Michigan building code, R 408.30401 to R 408.30499a; the Michigan electrical code, R 408.30801 to R 408.30880; the Michigan plumbing code, R 408.30701 to R 408.30796; and the Michigan rehabilitation code, R 408.30551 to R 408.30577, are available for inspection and distribution at cost at the Department of Licensing and Regulatory Affairs, Bureau of Construction Codes, 611 W. Ottawa, Lansing, MI 48933. Copies of these rules are available at no cost from the Michigan government website, www.michigan.gov/orr and linking to “Michigan administrative code”.

R 29.1903 Definitions.

Rule 3. As used in these rules:

(a) "Act" means 1941 PA 207, MCL 29.1 to 29.34

(b) "Authority having jurisdiction" means the director of the department of licensing and regulatory affairs, an employee of the department of licensing and regulatory affairs appointed by the director to implement the act, or an employee of a city, village, or township delegated authority to enforce the code under section 2b of the act.

(c) "Code" means national fire protection association pamphlet no. 101, 2012 edition, entitled "Life Safety Code."

(d) "College" or "university" means a junior college, community college, college, or university that is duly authorized to grant degrees by 1 of the following:
(i) Article VIII of the Michigan Constitution of 1963.
(ii) The Michigan legislature.
(iii) Action by the state board of education.
(e) "Cosmetic remodeling" means surface changes solely to the wall, floor, and ceiling that do not decrease the fire rating of the wall, floor, or ceiling, including the replacement of windows and doors.
(f) “Instructional facility” means a building or part of a building that is used for mandatory instructional purposes, is occupied by 6 or more students and used 4 or more hours per day or more than 12 hours per week, and is owned or leased by, or under the control of a college or university as defined in these rules.
(g) "Maintenance" means repair required to keep a building and its component parts in an operative condition at all times, including the replacement of its component parts when, for any reason, the component parts are no longer dependable. "Maintenance" does not include renovation.
(h) "Open court" means a court that is open and unobstructed on at least 1 side by a minimum of 20 feet in width and 13 feet 6 inches in height. The opening shall lead to a public way.
(i) "Penthouse" means an enclosed, unoccupied structure above the roof of a building, other than a tank, tower, spire, dome cupola, or bulkhead. The aggregate area shall not exceed 1/3 of the supporting roof. A penthouse shall be considered as part of the story below.
(j) "Room" means a space or area bounded by any obstruction to egress that, at any time, encloses more than 80% of the perimeter of the space or area. An opening that is less than 3 feet clear wide and less than 6 feet 8 inches high shall not be considered in computing the unobstructed perimeter. A vestibule that is used for weather protection is not a room for the purposes of these rules.
(k) "School" means a building or part of a building that is owned or leased by, or under the control of, a public or private school or school system for the purpose of instruction as required by section 1561 of 1976 PA451, MCL 380.1561 that is occupied by 6 or more students, and is used 4 or more hours per day or more than 12 hours per week. School does not mean a college building or university building.
(l) “Stop work order” means a notice from the authority having jurisdiction to immediately cease work being done because the work being performed is contrary to the rules or is being performed in a dangerous or unsafe manner. Any person who continues to work after being served with a stop work order, except the work that the person is directed to perform to remove a violation or unsafe condition, to provide for security of the building or to provide for weather protection of the building, shall be subject to penalties described by the act.

R 29.1904 Plans and specifications.
Rule 4. (1) A school, college, university, or designated representative shall submit plans and specifications to the bureau of fire services for all projects that involve construction, remodeling, renovation, modification, reconstruction, or an addition.
(2) A school, college, or university need not submit plans and specifications to the bureau of fire services for routine maintenance functions or cosmetic remodeling; however, a school, college, or university shall ensure that all work is in compliance with these rules.
(3) Plans and specifications for work that involves the practice of architecture or engineering, as defined by the provisions of article 20 of the occupational code, 1980 PA 299, MCL 339.2001

to 339.2014, shall bear the seal of an architect or professional engineer who is licensed pursuant to the occupational code. If a public works project consisting of construction, renovation, modification, reconstruction, or an addition is estimated to cost less than $15,000.00, it is not necessary to employ a registered architect or engineer, but the plans for the building shall be submitted to the bureau of fire services for approval pursuant to section 5a of 1937 PA 306, MCL 388.855a.

(4) Plans and specifications shall contain all of the following information, as applicable:

(a) A complete floor plan and layout of the building drawn accurately to scale.

(b) The use of each room.

(c) The dimensions of each room.

(d) The size, location, direction of swing, and fire rating of each door and frame assembly.

(e) The size and location of windows.

(f) The wall construction, including the fire-resistance rating.

(g) The type of construction as identified in national fire protection association pamphlet no. 220, entitled "Standard on Types of Building Construction," as adopted in these rules.

(h) The number of stories, including basement and attic areas.

(i) The interior finish classification.

(j) The location of fuel-fired equipment.

(k) The type of furnace and water heater.

(l) Air-handling systems.

(m) Fire detection and alarm system~~s~~ plans and specifications in compliance with the provisions of the act.

(n) Sprinkler or other suppression system plans and specifications in compliance with the provisions of the act.

(o) The type, size, and location of fire extinguishers.

(p) Other pertinent information that is required to determine compliance with these rules.

(5) A firm certified in compliance with section 26 of 1941 PA 207, MCL 29.26, shall submit fire alarm/detection system and fire suppression system plans to the bureau of fire services pursuant to the act.

(6) Plan approval that is given before the effective date of these rules shall terminate 6 months after the effective date of these rules if construction has not started. However, upon written request, the bureau of fire services may grant an approval extension in a specific instance.

(7) Projects that involve construction, remodeling, or an addition, including fire alarm or fire detection systems and fire suppression systems, discovered to be in violation of the requirement of this rule shall be subject to the issuance of a stop work order by the authority having jurisdiction. Inspections shall not be conducted and approval shall not be granted by the authority having jurisdiction until the provisions of this rule are met.

R 29.1905 Inspection during construction; inspection of existing facilities; approval for occupancy.

Rule 5. (1) During construction, renovation, modification, reconstruction, addition, or remodeling, the architect, professional engineer, or owner's representative shall notify the bureau of fire services when the building is ready for inspection under both of the following conditions:

(a) When the building is framed and mechanical systems are substantially complete, but before concealment.

(b) Upon completion of construction.

(2) A person shall not occupy a newly constructed facility or a facility that is being remodeled or added to, in whole or in part, without the approval of the bureau of fire services.

(3) The bureau may approve for continuous use an existing school, college, or university instructional facility or building established prior to the effective date of these rules if it conforms to, or is made to conform to, the provisions of these rules to the extent that, in the opinion of the authority having jurisdiction, reasonable life safety against the hazards of fire, explosion, and panic is provided and maintained.

(4) While conducting project inspections pursuant to these rules or an investigation in reference to a fire hazard or life safety complaint pursuant to the act, in an existing school, college, or university instructional facility or building, the bureau of fire services may request to review documents related to the continued operation and maintenance of the following systems or items pursuant to section 4.5.8 and the applicable sections of chapter 4, 7, and 9 of the code.

(a) Fire alarm system.
(b) Sprinkler system.
(c) Hood suppression systems.
(d) Emergency lighting.
(e) Fire extinguishers.
(f) Required emergency generators.
(g) Egress signage.
(h) Door locking systems.
(i) Record of fire and emergency drills as required by the act.
(j) Emergency plans.
(k) Any other life safety system.

R 29.1906 Projects affecting outside configuration of building; site plan and specifications; bureau of fire services or local fire authority specifications; fire safety measures during construction.

Rule 6. (1) For projects involving construction, addition, renovation, modification, reconstruction, or remodeling that affect the outside configuration of a building, and as part of the building plans and specifications otherwise required by these rules, before the construction begins, the owner or the owner's authorized representative shall provide the bureau of fire services and the local fire authority with a site plan and specifications that detail all of the following information, as applicable:

(a) The available water supply.
(b) Hydrant locations.
(c) Vehicle access routes.
(d) Fire lanes.

(2) The authority having jurisdiction or the local fire authority may specify any of the following:

(a) The size of the water mains that supply they hydrants.
(b) The location of the hydrants.
(c) The location and dimensions of fire department vehicle access routes.
(d) The posting of fire lanes.

(3) As soon as possible during construction, the school, college, university, or designated representative shall ensure that appropriate fire safety measures are taken, including the

provision of fire extinguishers and fire suppression systems, and the establishment of access routes to the building that can be traveled by fire department vehicles.

R 29.1907 Electrical equipment; inspections; certificate.
Rule 7. (1) The school, college, university, or designated representative shall ensure that the electrical wiring and equipment, including an emergency supply if installed, complies with the applicable provisions of the Michigan electrical code, R 408.30801 to R 408.30880. Copies of the rules are available as specified in R 29.1902.
(2) An electrical inspection authority acceptable to the bureau of fire services shall perform the electrical inspection. The electrical inspection authority shall issue a final certificate of compliance covering the installation. The school, college, university, or designated representative shall provide a copy of the certificate to the bureau of fire services.

R 29.1907a Fire reporting.
Rule 7a. (1) Upon discovery of any unwanted fire, regardless of magnitude, the person in control of the building shall immediately notify the local fire department.
(2) Whenever an unwanted fire occurs, or upon discovery of an unwanted fire, even though it has been extinguished, the person in control of the building shall immediately notify the local fire department of the existence of the fire, circumstances, and the location of the fire. This subrule does not prohibit the facility from using all diligence necessary to extinguish the fire prior to the arrival of the fire department.
(3) The school, college, university, or designated representative shall notify the bureau of fire services of all details of the fire not later than the end of the next business day following the incident.

R 29.1908 Universal amendments.
Rule 8. Sections 4.6.10.1, 4.7.4, 4.8.2.2, 6.2.1.2, 7.2.1.12, 8.3.5, 8.3.5.5.1, 8.3.6.1, 8.4.2, 8.4.5.1, 8.5.7.1, 8.6.10.2.1, 8.7.3.1, 9.1.1, 9.4.2.1, 9.4.2.2, 9.6.3.5.5, 12.3.2.1.2, 12.7.6.1, 13.3.2.1.2, 13.7.6.1, and 43.1.2.1 of the code adopted by reference in R 29.1902 are amended, section 8.6.10.2.1.1 is added, and sections 7.2.1.12.1, 7.2.1.12.2, 7.3.3.2, 9.1.2, 9.4.3.1, 9.4.3.2, 12.2.2.2.5, 12.2.10.3, 12.2.11.2, 12.7.1.3, 12.7.6.2, 12.7.7.2, 12.7.9.3.1, 12.7.9.3.2, 12.7.9.3.3, 13.2.2.2.5, 13.2.10.3, 13.2.11.2, 13.7.1.3, 13.7.6.2, 13.7.7.2, 13.7.9.3.1, 13.7.9.3.2, 13.7.9.3.3, and 43.1.4.5 of the code are deleted, as follows:
4.6.10.1. Buildings or portions of buildings shall be permitted to be occupied during construction, repair, alterations, or additions only where all means of egress and required fire protection features in the building and on-site are in place and continuously maintained for the portion occupied and if the occupied portion is separated from the part under construction by a wall that has a 1-hour-fire-resistance rating. The temporary 1-hour-rated wall that is used for separation may be constructed of combustible material. Instead of having all means of egress and fire protection features in place, the school, college, university, or designated representative may take other measures that would provide equivalent safety if approved by the bureau of fire services.
4.7.4. Drills shall be held at various times under varying conditions to simulate the unusual conditions that can occur in an actual emergency.
4.8.2.2. Upon request from the bureau of fire services, the school, college, university, or designated representative shall submit the required emergency plans for review.
6.2.1.2. Hazard of contents shall be classified by the registered design professional (RDP) or owner and upon request shall be submitted to the authority having jurisdiction for review and

approval on the basis of character of the contents and the processes of operations conducted in the building or structure.
7.2.1.12. Where permanently mounted folding or movable partitions divide a room into smaller spaces, a swinging door leaf or open doorway shall be provided as an exit access from each space.
7.2.1.12.1. Deleted.
7.2.1.12.2. Deleted.
7.3.3.2. Deleted.
8.3.5. The provisions of section 8.3.5 shall govern the materials and methods of construction used to protect through-penetration and membrane penetrations in fire walls, fire barrier walls, and fire resistance-rated horizontal assemblies. The provisions of section 8.3.5 shall not apply to existing material and methods of construction used to protect existing through-penetrations and existing membrane penetrations in fire walls, fire barrier walls, or fire resistance-rated horizontal assemblies, unless otherwise required by chapters 11 to 43.
8.3.5.5.1. Where piping penetrates a fire resistance-rated wall or floor assembly, combustible piping shall not connect to noncombustible piping within 35 inches (915 millimeters) of the firestop system or device with the demonstration that the transition will not reduce the fire resistance rating, except in the case of existing installations.
8.3.6.1. The provisions of section 8.3.6 shall govern the materials and methods of construction used to protect joints in between and at the perimeter of fire barriers or, where fire barriers meet other fire barriers, the floor or roof deck above, or the outside walls. The provisions of section 8.3.6 shall not apply to existing materials and methods of construction used to protect existing joints in fire barriers, unless otherwise required by chapters 11 to 43.
8.4.2. The following shall apply to smoke partitions:
(1) They shall extend from the floor to the underside of the floor or roof deck above, through any concealed spaces, such as those above suspended ceilings, and through interstitial structural and mechanical spaces.
(2) They shall be permitted to extend from the floor to the underside of a monolithic or suspended ceiling where the following conditions are met:
(a) The ceiling system forms a continuous membrane.
(b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.
(c) Where the space above the ceiling is used as a plenum, air transfer openings in smoke partitions into the plenum shall be provided with approved smoke dampers designed and tested pursuant to the requirements of ANSI/UL 555S, standard for smoke dampers, to limit the transfer of smoke.
(3) Smoke partitions enclosing hazardous areas shall be permitted to terminate at the underside of a monolithic or suspended ceiling where the following conditions are met:
(a) The ceiling system forms a continuous membrane.
(b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.
(c) Where the space above the ceiling is used as a plenum, air transfer openings in smoke partitions into the plenum shall be provided with approved smoke dampers designed and tested pursuant to the requirements of ANSI/UL 555S, standard for smoke dampers, to limit the transfer of smoke.
8.4.5.1. The provisions of section 8.4.5 shall govern the materials and methods of construction used to protect joints in between and at the perimeter of smoke partitions or, where smoke partitions meet other smoke partitions, the floor or roof deck above or, the outside walls. The

provisions of section 8.4.5 shall not apply to existing materials and methods of construction used to protect existing joints in smoke partitions, unless otherwise required by chapters 11 to 43.
8.5.7.1. The provisions of section 8.5.7 shall govern the materials and methods of construction used to protect joints in between and at the perimeter of smoke barriers, or where barriers meet other smoke barriers, the floor or roof deck above, or the outside walls.
8.6.10.2.1. Unless otherwise provided in section 8.6.10.2.1.1, the aggregate area of a mezzanine located within a room, other than those located in a special-purpose industrial occupancies, shall not exceed one-third the open area of the room in which the mezzanines are located. Enclosed spaces shall not be included in a determination of the size of the room in which the mezzanine is located.
8.6.10.2.1.1. The aggregate area of mezzanines in buildings and structures of type I of type II construction shall not exceed one-half of the floor area of the room in buildings and structures equipped throughout with an approved automatic sprinkler system pursuant to section 9.7 and an approved emergency voice or emergency alarm communication system pursuant to NFPA 72.
8.7.3.1. The school, college, university, or designated representative shall store and handle flammable and combustible liquids in compliance with the storage and handling of flammable and combustible liquids, R 29.5101 to R 29.5516.
9.1.1. The school, college, university, or designated representative shall ensure the equipment which utilizes gas and related gas piping is installed in compliance with the provisions of NFPA 54, national fuel gas code, NFPA 58, liquefied petroleum gas code, or rules promulgated under the act, as applicable.
9.1.2. Deleted.
9.4.2.1. The school, college, university, or designated representative shall ensure that new elevators, escalators, dumbwaiters, and moving walks are installed pursuant to the Michigan elevator rules, R 408.7001 to R 408.8695.
9.4.2.2. The school, college, university, or designated representative shall ensure that existing elevators, escalators, dumbwaiters, and moving walks are in compliance with the Michigan elevator rules, R 408.7001 to R 408.8695.
9.4.3.1. Deleted.
9.4.3.2. Deleted.
9.6.3.5.5. Visible signals shall not be required in any of the following areas:
(1) Exit stair enclosures.
(2) Offices less than 200 square feet.
(3) Closets and coat rooms.
(4) Electrical closets.
(5) Mechanical pipe chases.
(6) Crawl spaces.
(7) Small bathrooms in classrooms.
(8) Janitor closets.
(9) Storage rooms less than 200 square feet.
(10) Unoccupied spaces.
12.2.2.2.5. Deleted.
12.2.10.3. Deleted.
12.2.11.2. Deleted.
12.3.2.1.2. Rooms or spaces for the storage, processing, or use of materials specified in section 12.3.2.1.2(1) to (3) shall be protected pursuant to the following:

(1) Separation from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating or protection of such rooms by automatic extinguishing systems as specified in section 8.7 in the following areas:

(a) Boiler and furnace rooms, unless otherwise permitted by either of the following:

(i) The requirement of section 12.3.2.1.2(1)(a) shall not apply to rooms enclosing furnaces, heating and air-handling equipment, or compressor equipment with a total aggregate input rating less than 200,000 BTU (211MJ), provided that such rooms are not used for storage.

(ii) The requirement of section 12.3.2.1.2(1)(a) shall not apply to attic locations of the rooms addressed in section 12.3.2.1.2(1)(a)(i), provided that such rooms comply with the draftstopping requirements of section 8.6.10.

(b) Rooms or spaces larger than 100 square feet (4.6 square meters) and used for the storage of combustible supplies.

(c) Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.

(2) Separation from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating and protection of such rooms by automatic extinguishing systems as specified in section 8.7 in the following areas:

(a) Laundries.

(b) Maintenance shops, including woodworking and painting areas.

(c) Rooms or spaces used for the processing or use of combustible supplies deemed hazardous by the authority having jurisdiction.

(d) Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.

(3) Where automatic extinguishing is used to meet the requirements of section 12.3.2.1.2(1) or (2), the protection shall be permitted pursuant to section 9.7.1.2.

12.7.1.3. Deleted.

12.7.6.1. In assembly use areas having occupant loads greater than 1,000, there shall be crowd managers or crowd manager supervisors at a ratio of 1 crowd manager/supervisor for every 250 occupants unless otherwise permitted by any of the following:

(1) This requirement shall not apply to assembly use areas being utilized for instructional classroom space.

(2) This requirement shall not apply to assembly occupancies used exclusively for religious worship with occupant load not more than 2,000.

(3) The ratio of trained crowd managers to occupants shall be permitted to be reduced where, in the opinion of the authority having jurisdiction, the existence of an approved, supervised automatic sprinkler system and the nature of the event warrant.

12.7.6.2. Deleted.

12.7.7.2. Deleted.

12.7.9.3.1. Deleted.

12.7.9.3.2. Deleted.

12.7.9.3.3. Deleted.

13.2.2.2.5. Deleted.

13.2.10.3. Deleted.

13.2.11.2. Deleted.

13.3.2.1.2. Rooms or spaces for the storage, processing, or use of materials specified in section 13.3.2.1.2(1) to (3) shall be protected pursuant to the following:

(1) Separation from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating or protection of such rooms by automatic extinguishing systems as specified in section 8.7 in the following areas:

(a) Boiler and furnace rooms, unless otherwise permitted by either of the following:

(i) The requirement of section 13.3.2.1.2(1)(a) shall not apply to rooms enclosing furnaces, heating and air handling equipment, or compressor equipment with a total aggregate input rating less than 200,000 Btu (211 MJ), provided that such rooms are not used for storage.

(ii) The requirement of section 13.3.2.1.2(1)(a) shall not apply to attic locations of the rooms addressed in section 13.3.2.1.2(1)(a)(i), provided that such rooms comply with the draftstopping requirements of section 8.6.10.

(b) Rooms or spaces larger than 100 square feet (4.6 square meters) and used for the storage of combustible supplies.

(c) Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.

(2) Separation from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating and protection of such rooms by automatic extinguishing systems as specified in section 8.7 in the following areas:

(a) Laundries.

(b) Maintenance shops, including woodworking and painting areas.

(c) Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.

(3) Where automatic extinguishing is used to meet the requirements of section 13.3.2.1.2(1) or (2), the protection shall be permitted pursuant to section 9.7.1.2.

13.7.1.3. Deleted.

13.7.6.1. In assembly occupancies having occupant loads greater than 1,000, there shall be crowd managers or crowd manager supervisors at a ratio of 1 crowd manager/supervisor for every 250 occupants unless otherwise permitted by either of the following:

(1) This requirement shall not apply to assembly use areas being utilized for instructional classroom space.

(2) This requirement shall not apply to assembly occupancies used exclusively for religious worship with occupant load not more than 2,000.

(3) The ratio of trained crowd managers to occupants shall be permitted to be reduced where, in the opinion of the authority having jurisdiction, the existence of an approved, supervised automatic sprinkler system and the nature of the event warrant.

13.7.6.2. Deleted.

13.7.7.2. Deleted.

13.7.9.3.1. Deleted.

13.7.9.3.2. Deleted.

13.7.9.3.3. Deleted.

43.1.2.1. The portion or portions of a building undergoing repair, renovation, modification, or reconstruction shall comply with both of the following:

(1) Requirements of the applicable existing occupancy chapters.

(2) Requirements of the applicable section of this chapter.

43.1.4.5. Deleted.

Rescinded.

PART 2. SCHOOLS

R 29.1921 Life safety code; adoption by reference of standards for new schools.
Rule 21. The provisions of chapters 1 to 12, 14, and 43 of the code that apply to new educational occupancies are adopted by reference in R 29.1902 except as amended by these rules.

R 29.1922 Amendments.
Rule 22. Sections 14.1.2.2, 14.1.6, 14.2.6.2, 14.2.6.3, 14.2.11.1.1, 14.2.11.2, 14.3.2.1, 14.3.4.1.2, 14.3.4.2.1, and 14.7.2.1 of the code are amended, sections 14.1.2.1.1, 14.1.2.2.1, 14.2.11.1.3, 14.3.2.5.1, 14.3.4.4, 14.3.4.5, 14.7.4.2.1, and 14.7.4.4 are added to the code, and sections 14.2.2.2.3.1, 14.3.4.2.3, 14.3.4.2.3.1, 14.3.4.2.3.2, 14.7.2.2, 14.7.2.3, and 14.7.3.3 are deleted to read as follows:
14.1.2.1.1. Educational occupancies shall include child care operations established and operated by an intermediate school board, the board of a local school district, the board or governing body of a state-approved nonpublic school, or by a person or entity with whom a school contracts for services, if the child care center is located in a school that is approved by the state fire marshal.
14.1.2.2. Unless otherwise permitted by section 14.1.2.1.1 educational occupancies shall not include any of the following:
(a) A part or full-day preschool.
(b) A day care center.
(c) A kindergarten-only building.
(d) A building that houses a combination of preschool and kindergarten.
(e) A building that houses a combination of day care and kindergarten.
14.1.2.2.1. A program specifically tailored for special needs children, special needs adults, or both, who range from 17 to 26 years of age, that is located in a community in a facility such as a shopping mall or business building, where the students will gain specific job experience and learn life studies, shall not be defined as a school.
14.1.6. For minimum construction requirements refer to the Michigan building code, R 408.30401 to R 408.30499.
14.2.2.2.3.1. Deleted.
14.2.6.2. Travel distances to an exit shall not exceed 200 feet (61 meters) from any point in a building, unless otherwise permitted by section 14.2.6.3.
14.2.6.3. Travel distance shall not exceed 250 feet (76.2 meters) in educational occupancies protected throughout by an approved automatic sprinkler system pursuant to Section 9.7.
14.2.11.1.1. The school or designated representative shall ensure every room or space which is more than 250 square feet (23.2 square meters) and which is used for classroom or other educational purposes or is normally subject to student occupancy shall have not less than 1 outside window for emergency rescue or ventilation that complies with the following unless otherwise permitted by section 14.2.11.1.2:
(1) The windows shall be openable from the inside without the use of tools, only held closed by a single operation lock, and shall provide a clear opening of not less than 20 inches (50.8 centimeters) in width, 24 inches (61 centimeters) in height, and 5.7 square feet (0.5 square meters) in area. A screen on the window shall be readily removable without any special knowledge or tools.

(2) The bottom of the opening shall be not more than 44 inches (112 centimeters) above the floor, and any latching device shall be capable of being operated from not more than 54 inches (1370 mm) above the finished floor.
(3) The clear opening shall allow a rectangular solid, with a width and height that provides not less than the required 5.7 square feet (0.5 square meters) opening and a depth of not less than 20 inches (510 millimeters), to pass fully through the opening.
(4) The windows shall be accessible by the fire department and shall open into an area that has access to a public way. Windows opening onto an open court, as defined in the code, are acceptable.
(5) The windows shall be identified by a permanent durable and legible sign having letters that are not less than 5/8 of an inch high and 1/8 of an inch wide. The sign shall read "rescue window."
14.2.11.1.3. Windowless student occupied rooms in additions to existing buildings or renovated buildings shall be permitted where it is impractical to comply with section 14.2.11.1.1 where all of the following:
(1) A minimum of 50% of the required exits pass into a separate atmosphere created by a minimum 2-hour fire rated barrier with labeled 90-minute fire rated door assemblies in all openings. Glazing, other than permitted in the door by NFPA 80, shall be permitted only if the glazing has been tested for a 2-hour rating as well. The fire barrier shall completely separate the building from exterior wall to exterior wall.
(2) Each separate area shall have approved exiting pursuant to the code.
(3) A maximum of 25% of the total area of the student occupied rooms in the building shall be permitted to be windowless.
14.2.11.2. Lockups. Locking devices for designated "quiet rooms" shall meet all of the following criteria:
(1) The locking mechanism shall be a spring operated latch, which shall be manually depressed to keep it in the latched position. Upon manual release, the latch shall automatically return to the unlatched position.
(2) A viewing window shall be required for observation of the student.
(3) There shall be constant supervision by a teacher or responsible adult at all times a student is in the room.
14.3.2.1. Rooms or spaces for the storage, processing, or use of materials specified in section 14.3.2.1(1) to (4) shall be protected pursuant to the following:
(1) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistive rating or protected by automatic extinguishing systems as specified in section 8.7 in the following areas:
(a) Boiler and furnace rooms, unless the rooms enclose only air-handling equipment.
(b) Rooms or spaces greater than 100 square feet used for storage of combustible supplies.
(c) Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.
(d) Janitor closets [see also 14.3.2.1(4)].
(2) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating and protected by automatic extinguishing systems as specified in section 8.7 in the following areas:
(a) Laundries.
(b) Maintenance shops, including wood working and painting areas.
(c) Rooms or spaces used for the processing or use of combustible supplies deemed hazardous by recognized standards.

(d) Industrial arts and crafts rooms.
(3) Where automatic extinguishing is used to meet the requirements of section 14.3.2(1) or (2), the protection shall be permitted pursuant to section9.7.1.2.
(4) Where janitor closets addressed in section 14.3.2.1(1)(d) are protected pursuant to the sprinkler option of section 14.3.2.1(1), the janitor closet doors shall be permitted to have ventilating louvers.
14.3.2.5.1. The school or designated representative shall ensure that any room that is used for instruction and has 3 or more gas outlets be provided with a master gas valve which shall be conveniently located outside the door of the room and be clearly marked so that the valve may be closed without having to enter the room. This section shall not apply to life skills rooms in which gas outlets supply stoves for cooking.
14.3.4.1.2. The requirement of section 14.3.4.1.1 shall not apply to a building meeting all of the following criteria:
(1) Has an area not exceeding 1,000 square feet.
(2) Contains a single classroom.
(3) Is located not less than 10 feet from another building.
14.3.4.2.1. Initiation of the required fire alarm system shall be by manual means pursuant to section 9.6.2.1(1). Manual fire alarm pull stations shall be provided pursuant to sections 9.6.2.2 to 9.6.2.5 of the code and at all exterior doors in the natural path of escape whether or not the path of escape is designated a required exit by these rules.
14.3.4.2.3. Deleted.
14.3.4.2.3.1. Deleted.
14.3.4.2.3.2. Deleted.
14.3.4.4. The school fire alarm system shall be provided with zone annunciation pursuant to the requirements of section 9.6.7 of the code.
14.3.4.5. In buildings provided with automatic extinguishing protective systems, all extinguishing system control valves shall be electronically supervised through the fire alarm system to cause an audible and visual supervisory signal at a location in the building where the signal will alert responsible personnel.

14.7.2.1. Emergency egress drills shall be conducted pursuant to the act.
14.7.2.2. Deleted.
14.7.2.3. Deleted.
14.7.3.3. Deleted.
14.7.4.2.1. Items permitted to be located in required egress corridors, provided the required clear width of the corridor is not obstructed, are limited to include fixed benches or hardwood or non-combustible material, trophy cases which are not used for excessive amounts of combustible materials, drinking fountains, telephones, vending machines, and other fixtures or items as approved by the authority having jurisdiction.
14.7.4.4. Desks and other instructional equipment shall be prohibited in required egress corridors.

R 29.1923 Life safety code; adoption by reference of standards for existing schools.
Rule 23. The provisions of chapters 1 to 11, 13, 15, and 43 of the code that apply to existing educational occupancies are adopted by reference in R 29.1902, except as amended by these rules.

R 29.1924 Amendments.
Rule 24. Sections 15.1.2.2, 15.1.6, 15.2.6.2, 15.2.6.3, 15.2.11.1.1, 15.2.11.1.2, 15.2.11.2, 15.3.2.1, 15.3.4.1.2, 15.3.4.2.1, 15.3.6, 15.3.7.2, and 15.7.2.1 are amended, sections 15.1.2.1.1, 15.1.2.2.1, 15.2.11.1.3, 15.3.4.3.1.7, 15.7.4.2.1, and 15.7.4.4 are added and sections 15.2.2.2.3.1, 15.3.4.2.3, 15.3.4.2.3.1, 15.3.4.2.3.2, 15.7.2.2, 15.7.2.3, and 15.7.3.3 are deleted, to read as follows:
15.1.2.1.1. Educational occupancies shall include child care operations established and operated by an intermediate school board, the board of a local school district, the board or governing body of a state-approved nonpublic school, or by a person or entity with whom a school contracts for services, if the child care center in located in a school that is approved by the state fire marshal.
15.1.2.2. Unless otherwise permitted by section 15.1.4.1.1; educational occupancies shall not include any of the following:
(a) A part or full-day preschool.
(b) A day care center.
(c) A kindergarten-only building.
(d) A building that houses a combination of preschool and kindergarten.
(e) A building that houses a combination of day care and kindergarten.
15.1.2.2.1. A program specifically tailored for special needs children, special needs adults, or both, who range from 17 to 26 years of age, that is located in a community in a facility such as a shopping mall or business building, where the students will gain specific job experience and learn life studies, shall not be defined as a school.
15.1.6. For minimum construction requirements, refer to the Michigan rehabilitation code, R 408.30551 to R 408.30577.
15.2.2.2.3.1. Deleted.
15.2.6.2. Travel distances to an exit shall not exceed 200 feet (61 meters) from any point in the building unless otherwise permitted by section 15.2.6.3 or 15.2.6.4 (see also section 7.6).
15.2.6.3. Travel distance shall not exceed 250 feet (76.2 meters) in educational occupancies protected throughout with an approved automatic sprinkler system pursuant to section 9.7.
15.2.11.1.1. The school or designated representative shall ensure every room or space that is more than 250 square feet (23.2 square meters) and is used for classroom or other educational purposes or is normally subject to student occupancy shall have not less than 1 outside window for emergency rescue or ventilation that complies with the following unless otherwise permitted by section 15.2.11.1.2:
(1) The windows shall be openable from the inside without the use of tools, only held closed by a single operation lock, and provide~~s~~ a clear opening of not less than 20 inches (50.8 centimeters) in width, 24 inches (61 centimeters) in height, and 5.7 square feet (0.5 square meters) in area. A screen on the window shall be readily removable without any special knowledge or tools.
(2) The bottom of the opening shall be not more than 44 inches (112 centimeters) above the floor and any latching device shall be capable of being operated from not more than 54 inches (137 centimeters) above the finished floor.
(3) The clear opening shall allow a rectangular solid with a width and height that provides not less than the required 5.7 square foot opening and a depth of 20 inches to pass fully through the opening.

(4) The windows shall be accessible by the fire department and shall open into an area that has access to a public way. Windows opening onto an open court, as defined in the code, are acceptable.
(5) The windows shall be identified by a permanent, durable, and legible sign having letters not less than 5/8 of an inch high and 1/8 of an inch wide.
15.2.11.1.2. The requirements of section 15.2.11.1.1 shall not apply to any of the following:
(1) Buildings protected throughout by an approved automatic sprinkler system in compliance with section 9.7.
(2) Where the room or space has a door leading directly to the outside of the building.
(3) Rooms located 4 or more stories above the finished ground level.
(4) Where awning type or hopper-type windows that are hinged or subdivided to provide a clear opening of not less than 4 square feet (0.38 square meters) or any dimension of not less than 22 inches (560 millimeters) meet the following criteria:
(a) The windows shall be permitted to continue in use.
(b) Screen walls or devices located in front of required windows shall not interfere with rescue requirements.
(5) Where a room or space complies with the following:
(a) Doors shall exist that allow travel between adjacent classrooms.
(b) Doors used to travel from classroom to classroom shall provide either of the following:
(i) Direct access to exits in both directions.
(ii) Direct access to an exit in 1 direction and to a separate smoke compartment that provides access to another exit in the other direction.
(c) The corridor shall be separated from the classrooms by a wall that restricts the passage of smoke, and all doors between the classrooms and corridor shall be self-closing or automatic-closing pursuant to section 7.2.1.8.
(d) The length of travel to exits along such paths shall not exceed 150 feet (46 meters).
(e) Each communicating door shall be marked in accordance with section 7.10.
(f) No locking device shall be permitted on the communicating doors.
(6) If a window retrofit project is undertaken, then compliance with the window clear opening dimensions is not required. Unless the existing sill construction is being modified, the existing sill height can be maintained. All other requirements of section 15.2.11.1.1 shall apply.
(7) A school building constructed before August 1, 1989, that is in compliance with both of the following provisions:
(a) The windowless section of the story is not more than 25% of the total area of the story, excluding corridors.
(b) All windowless rooms, spaces, and public assembly places have 50% of their required exits visible directly to the exterior of the building and within 20 feet from the door of the occupied room.
15.2.11.1.3. Windowless student occupied rooms in additions to existing buildings or renovated buildings shall be permitted where it is impractical to comply with section 15.2.11.1.1 where all of the following:
(1) A minimum of 50% of the required exits pass into a separate atmosphere created by a minimum 2-hour fire rated barrier with labeled 90-minute fire rated door assemblies in all openings. Glazing, other than permitted in the door by NFPA 80, shall be permitted only if the glazing has been tested for a 2-hour rating as well. Such construction shall completely separate the building from exterior wall to exterior wall.
(2) Each separate area shall have approved exiting pursuant to the code.

(3) A maximum of 25% of the total area of the student occupied rooms in the building shall be permitted to be windowless.
15.2.11.2. Lockups. Locking devices for designated "quiet rooms" shall meet all of the following criteria:
(1) The locking mechanism shall be a spring operated latch, which is manually depressed to keep it in the latched position. Upon manual release, the latch shall automatically return to the unlatched position.
(2) A viewing window shall be required for observation of the student.
(3) There shall be constant supervision by a teacher or responsible adult at all times a student is in the room.
15.3.2.1. Rooms or spaces for the storage, processing, or use of materials specified in section 15.3.2.1(1) to (4) shall be protected pursuant to the following:
(1) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistive rating or protected by automatic extinguishing systems as specified in section 8.7 in the following areas:
(a) Boiler and furnace rooms, unless such rooms enclose only air-handling equipment.
(b) Rooms or spaces greater than 100 square feet used for storage of combustible supplies.
(c) Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.
(d) Janitor closets [see also 15.3.2.1(4)].
(2) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating and protected by automatic extinguishing systems as specified in section 8.7 in the following areas:
(a) Laundries.
(b) Maintenance shops, including wood working and painting areas.
(c) Rooms or spaces used for the processing or use of combustible supplies deemed hazardous by recognized standards.
(d) Industrial arts and crafts rooms.
(3) Where automatic extinguishing is used to meet the requirements of section 15.3.2(1) or (2), the protection shall be permitted pursuant to section 9.7.1.2.
(4) Where janitor closets addressed in section 15.3.2.1(1)(d) are protected pursuant to the sprinkler option of section 15.3.2.1(1), the janitor closet doors shall be permitted to have ventilating louvers.
15.3.4.1.2. The requirements of section 15.3.4.1.1 shall not apply to buildings meeting all of the following criteria:
(1) Buildings having an area not exceeding 1,000 square feet.
(2) Buildings containing a single classroom.
(3) Building located not less than 10 feet from another building.
15.3.4.2.1. Initiation of the required fire alarm system shall be by manual means in accordance with section 9.6.2.1(1). Manual fire alarm pull stations shall be provided pursuant to sections 9.6.2.2 to 9.6.2.5 of the code and at all exterior doors in the natural path of escape whether or not the path of escape is designated a required exit by these rules.
15.3.4.2.3. Deleted.
15.3.4.2.3.1. Deleted.
15.3.4.2.3.2. Deleted.
15.3.4.3.1.7. A presignal system pursuant to section 9.6.3.3 shall be permitted.
15.3.6. Corridors shall be separated from other parts of the story by walls having a minimum 1-hour-fire-resistance rating pursuant to section 8.3 unless otherwise permitted by the following:

(1) Corridor protection shall not be required where all spaces normally subject to student occupancy have at least 1 door opening directly to the outside or to an exterior exit access balcony or corridor pursuant to section 7.5.3.
(2) The following shall apply to buildings protected throughout by an approved automatic sprinkler system with valve supervision pursuant to section 9.7:
(a) Corridor walls shall not be required to be rated, provided that the walls form smoke partitions pursuant to section 8.4.
(b) The provisions of section 8.4.3.5 shall not apply to normally occupied classrooms.
(3) Where the corridor ceiling is an assembly having a 1-hour-fire-resistance rating where tested as a wall, the corridor wall shall terminate at the corridor ceiling.
(4) Lavatories shall not be required to be separated from corridors, provided they are separated from all other spaces by walls having a 1-hour-fire-resistance rating pursuant to section 8.3.
(5) Lavatories shall not be required to be separated from corridors, provided that the building is protected throughout by an approved, supervised automatic sprinkler system pursuant to section 9.7.
(6) In school buildings constructed before August 1, 1989, every interior corridor, including corridors in flexible plan buildings, shall be constructed to be reasonably smoke-tight.
(7) In a school building constructed before August 1, 1989, and which is protected throughout by an approved automatic sprinkler system installed pursuant to section 9.7 of the code, corridor walls are not required.
15.3.7.2. The requirements of section 15.3.7.1 shall not apply to any of the following:
(1) Where all classrooms have exterior exit access pursuant to section 7.5.3.
(2) Buildings protected throughout by an approved automatic sprinkler system pursuant to section 9.7.
15.7.2.1. Emergency egress drills shall be conducted pursuant to the act.
15.7.2.2. Deleted.
15.7.2.3. Deleted.
15.7.3.3. Deleted.
15.7.4.2.1. Items permitted to be located in exit corridors, provided the required clear width of the corridor is not obstructed, shall be limited to include fixed benches or hardwood or non-combustible material, trophy cases which are not used for excessive amounts of combustible materials, drinking fountains, telephones, vending machines, and other fixtures or items as approved by the authority having jurisdiction.
15.7.4.4. Desks and other instructional equipment shall be prohibited in required egress corridors.

PART 3. COLLEGES AND UNIVERSITIES

R 29.1931 Life safety code; adoption by reference for new colleges and universities.
Rule 31. The provisions of chapters 1 to 12, 38, and 43 of the code that apply to new business occupancies, are adopted by reference in R 29.1902, except as amended by these rules.

R 29.1932 Amendments.
Rule 32. Sections 38.1.6, 38.3.2.1, 38.3.4.2, and 38.7.2 are amended, sections 38.1.1.1.1, 38.1.3.1.1.1, and 38.3.2.4 are added, as follows:
38.1.1.1.1. A change of use from a business occupancy to a college or university instructional facility shall be reviewed and inspected pursuant to section 43.7.2 for a change of occupancy.

38.1.3.1.1.1. If other business occupancies or uses occur in the same building that houses a college or university instructional facility, the provisions of section 6.1.14 for multiple occupancies shall apply. A college or university instructional facility that is separated from the remainder of a business occupancy by 2-hour fire resistance rated assemblies pursuant to section 6-1.14.4 shall be considered separate occupancies. Where the building is protected throughout by an approved automatic sprinkler system pursuant to section 9.7.1.1(1) and supervised pursuant to section 9.7.2, the fire resistance rated separations shall be permitted to be reduced to a 1-hour fire resistance-rated assemblies pursuant to section 6.1.14.4.3.
38.1.6. For minimum construction requirements, refer to the Michigan building code, R 408.30401 to R 408.30499.
38.3.2.1. Rooms or spaces for the storage, processing, or use of materials specified in section 38.3.2.1(1) to (3) shall be protected pursuant to the following:
(1) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistive rating or protected by automatic extinguishing systems as specified in section 8.7 in the following areas:
(a) Boiler and furnace rooms, unless such rooms enclose only air-handling equipment.
(b) Rooms or spaces greater than 100 square feet used for storage of combustible supplies.
(c) Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.
(2) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating and protected by automatic extinguishing systems as specified in section 8.7 in the following areas:
(a) Laundries.
(b) Maintenance shops, including wood working and painting areas.
(c) Rooms or spaces used for the processing or use of combustible supplies deemed hazardous by recognized standards.
(d) Industrial arts and crafts rooms.
(3) Where automatic extinguishing is used to meet the requirements of section 38.3.2(1) or (2), the protection shall be permitted pursuant to section 9.7.1.2.
38.3.2.4. Laboratories that use chemicals shall comply with NFPA 45. The college, university, or designated representative shall ensure that laboratory units used for instructional purposes shall be separated from non-laboratory areas by 1-hour fire rated construction regardless of the presence of fire protection. Any room which has 3 or more gas outlets shall be provided with a master gas valve which is conveniently located outside the door of the room and is clearly marked so that the valve may be closed without having to enter the room.
38.3.4.2. Initiation of the required fire alarm system shall be by all of the following means where provided:
(1) Manual means pursuant to section 9.6.2.1(1).
(2) Means of an approved automatic fire detection system that complies with section 9.6.2.1(2) and provides protection throughout the building.
(3) Means of an approved automatic sprinkler system that complies with section 9.6.2.1(3) and provides protection throughout the building.
38.7.2. Fire drills shall be held pursuant to the act.

R 29.1933 Life safety code; adoption by reference of standards for ~~new~~ existing colleges and universities.

Rule 33. The provisions of chapters 1 to 11, 13, 39 and 43 of the code that apply to existing business occupancies, are adopted by reference in R 29.1902, except as amended by these rules.

R 29.1934 Amendments.

Rule 34. Sections 39.1.6, 39.3.2.1, 39.3.4.2, and 39.7.2 are amended as follows:

39.1.6. For minimum construction requirements, refer to the Michigan rehabilitation code, R 408.30551 to R 408.30577.

39.3.2.1. Rooms or spaces for the storage, processing, or use of materials specified in section 39.3.2.1(1) to (3) shall be protected pursuant to the following:

(1) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistive rating or protected by automatic extinguishing systems as specified in section 8.7 in the following areas:

(a) Boiler and furnace rooms, unless such rooms enclose only air-handling equipment.

(b) Rooms or spaces greater than 100 square feet used for storage of combustible supplies.

(c) Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.

(2) The rooms or spaces shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating and protected by automatic extinguishing systems as specified in section 8.7 in the following areas:

(a) Laundries.

(b) Maintenance shops, including wood working and painting areas.

(c) Rooms or spaces used for the processing or use of combustible supplies deemed hazardous by recognized standards.

(d) Industrial arts and crafts rooms.

(3) Where automatic extinguishing is used to meet the requirements of section 39.3.2(1) or (2), the protection shall be permitted pursuant to section 9.7.1.2.

39.3.4.2. Initiation of the required fire alarm system shall be by all of the following means where provided:

(1) Manual means pursuant to section 9.6.2.1(1).

(2) Means of an approved automatic fire detection system that complies with section 9.6.2.1(2) and provides protection throughout the building.

(3) Means of an approved automatic sprinkler system that complies with section 9.6.2.1(3) and provides protection throughout the building.

39.7.2. Fire drills shall be held pursuant to the act.

ADMINISTRATIVE RULES

DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

DIRECTOR'S OFFICE

IONIZING RADIATION RULES GOVERNING THE USE OF RADIATION MACHINES

Filed with the Secretary of State on May 25, 2016
These rules take effect upon filing with the Secretary of State of Michigan

(By authority conferred on the director of the department of licensing and regulatory affairs by section 13521, 1978 PA 368, MCL 333.13521 and Executive Reorganization Order Nos. 1996-1, 1996-2, 2003-1, and 2011-4 being MCL 330.3101, 445.2001, 445.2011, and 445.2030)

R 333.5001, R 333.5002, R 333.5003, R 333.5004, R 333.5005, R 333.5006, R 333.5007, R 333.5008, R 333.5009, R 333.5010, R 333.5011, R 333.5012, R 333.5013, R 333.5015, R 333.5017, R 333.5018, R 333.5019, R 333.5020, R 333.5021, R 333.5023, R 333.5024, R 333.5026, R 333.5031, R 333.5032, R 333.5033, R 333.5034, R 333.5036, R 333.5037, R 333.5038, R 333.5039, R 333.5040, R 333.5041, R 333.5042, R 333.5043, R 333.5045, R 333.5046, R 333.5047, R 333.5051, R 333.5052, R 333.5053, R 333.5055, R 333.5057, R 333.5058, R 333.5059, R 333.5060, R 333.5061, R 333.5063, R 333.5064, R 333.5065, R 333.5067, R 333.5068, R 333.5069, R 333.5071, R 333.5072, R 333.5073, R 333.5074, R 333.5075, R 333.5077, R 333.5079, R 333.5080, R 333.5081, R 333.5082, R 333.5083, R 333.5084, R 333.5086, R 333.5087, R 333.5088, R 333.5089, R 333.5091, R 333.5092, R 333.5093, R 333.5094, R 333.5096, R 333.5097, R 333.5098, R 333.5100, R 333.5101, R 333.5281, R 333.5282, R 333.5293, R 333.5294, R 333.5296, R 333.5297, R 333.5298, R 333.5299, R 333.5302, R 333.5305, R 333.5306, R 333.5307, R 333.5308, R 333.5309, R 333.5311, R 333.5312, R 333.5315, R 333.5317, R 333.5321, R 333.5322, R 333.5323, R 333.5325, R 333.5331, R 333.5333, R 333.5337, R 333.5347, R 333.5348, R 333.5351, R 333.5352, R 333.5353, R 333.5355, R 333.5361, R 333.5362, R 333.5365, R 333.5366, R 333.5368, R 333.5371, R 333.5372, R 333.5373, R 333.5375, R 333.5376, R 333.5378, R 333.5379, R 333.5380, R 333.5381, R 333.5383, R 333.5384, R 333.5385, R 333.5386, R 333.5388, R 333.5389, R 333.5390, R 333.5391, R 333.5395, R 333.5396, R 333.5397, R 333.5401, R 333.5402, R 333.5403, R 333.5404, R 333.5405, R 333.5407, R 333.5409, R 333.5411, R 333.5417, R 333.5418, R 333.5421, R 333.5422, R 333.5423, R 333.5425, R 333.5431, R 333.5432, R 333.5435, R 333.5437, R 333.5438, R 333.5439, R 333.5440, R 333.5441, R 333.5442, R 333.5445, R 333.5446, R 333.5447, R 333.5448, R 333.5449, R 333.5450, R 333.5452, R 333.5481, R 333.5482, R 333.5484, R 333.5485, R 333.5486, R 333.5487, R 333.5491, R 333.5492, R 333.5493, R 333.5494, R 333.5495, R 333.5505, R 333.5506, R 333.5507, R 333.5508, R 333.5511, R 333.5601, R 333.5602, R 333.5603, R 333.5604, R 333.5605, R 333.5606, R 333.5607, R 333.5608, R 333.5609, R 333.5610, R 333.5611, R 333.5612, R 333.5613, R 333.5626, R 333.5627, R 333.5628, R 333.5629, R 333.5630, R 333.5634, R 333.5635, R 333.5637, R 333.5655, R 333.5656, R 333.5657, R 333.5658, R 333.5667, R 333.5668, R 333.5669, R 333.5674, R 333.5675, R 333.5676, R 333.5677, R 333.5678, R 333.5679, R 333.5681, R 333.5682, R 333.5683, R 333.5684,

R 333.5685, R 333.5686, R 333.5687, R 333.5688, R 333.5689, R 333.5690, R 333.5691, R 333.5692, R 333.5693, R 333.5694, R 333.5695, R 333.5696, R 333.5697, R 333.5701, R 333.5703, R 333.5705, R 333.5707, R 333.5709, R 333.5711, R 333.5713, R 333.5715, R 333.5717, R 333.5719, and R 333.5721 are added to the Michigan Administrative Code as follows:

PART 1. GENERAL PROVISIONS FOR THE USE OF RADIATION MACHINES

R 333.5001 Scope.
Rule 1. (1) Except as otherwise specified, these rules apply to a person who acquires, receives, owns, possesses, uses, stores, or transfers a radiation machine.
(2) Terms used in these rules shall have the same meaning as defined in the act.

R 333.5002 Definitions; A.
Rule 2. (1) "Absorbed dose" means the energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the gray (Gy) and the rad.
(2) "Accelerator" means a machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of 1 megaelectron volt (MeV).
(3) "Act" means 1978 PA 368, MCL 333.1101 to 333.25211. The terms defined in the act have the same meanings when used in these rules.
(4) "Annual" means a period of 12 consecutive months.
(5) "As low as reasonably achievable" (ALARA) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in these rules as is practical, consistent with the purpose for which the registered activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of registered radiation machines in the public interest.

R 333.5003 Definitions; C.
Rule 3. (1) "Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be so arranged such that no day is included in more than 1 calendar quarter and no day in any 1 year is omitted from inclusion within a calendar quarter. The method observed by the registrant for determining calendar quarters shall only be changed at the beginning of a year.
(2) "Calibration" means the determination of either of the following:
(a) The response or reading of an instrument relative to a series of known radiation values over the range of the instrument.
(b) The strength of a source of radiation relative to a standard.
(3) "Collective dose" means the sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation.
(4) "Controlled area" means an area, outside of a restricted area but inside the site boundary, access to which can be limited by the registrant for any reason.

R 333.5004 Definitions; D.

Rule 4. (1) "Deep dose equivalent" (H_d), which applies to external whole body exposure, means the dose equivalent at a tissue depth of 1 centimeter (1000 mg/cm^2).
(2) "Department" means the department of licensing and regulatory affairs.
(3) "Dose" or "radiation dose" means absorbed dose, dose equivalent, or effective dose equivalent as appropriate.
(4) "Dose equivalent (H_T)" means the product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the sievert (Sv) and rem.
(5) "Dose limits" or "limits" means the permissible upper bounds of radiation doses established under these rules.

R 333.5005 Definitions; E.
Rule 5. (1) "Effective dose equivalent (H_E)" means the sum of the products of the dose equivalent to the organ or tissue (H_T) and the weighting factor (W_T) applicable to each of the body organs or tissues that are irradiated ($H_E = \Sigma W_T H_T$).
(2) "Embryo or fetus" means the developing human organism from conception until the time of birth.
(3) "Entrance or access point" means a location through which an individual could gain access to radiation areas. This includes entry or exit portals of sufficient size to permit human entry, irrespective of their intended use.
(4) "Exposure" means being exposed to ionizing radiation.
(5) "External dose" means that portion of the dose equivalent received from a source of radiation outside the body.
(6) "Extremity" means hand, elbow, and arm below the elbow, foot, knee, and leg below the knee.
(7) "Extremity radiography" means radiography of the hand or arm excluding the shaft of the humerus or the foot or leg excluding the shaft of the femur.

R 333.5006 Definitions; H.
Rule 6. (1) "High radiation area" means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour at 30 centimeters from a source of radiation or 30 centimeters from any surface that the radiation penetrates.
(2) "Human use" means the internal or external administration of radiation to human beings.

R 333.5007 Definitions; I.
Rule 7. (1) "Individual" means a human being.
(2) "Individual monitoring" means the assessment of dose equivalent by the use of individual monitoring devices or by the use of survey data.
(3) "Individual monitoring device" means a device designed to be worn by a single individual for the assessment of dose equivalent. Film badges, thermoluminescence dosimeters (TLDs), pocket ionization chambers, and optically stimulated luminescence (OSL) dosimeters are examples of individual monitoring devices.
(4) "Inspection" means an official examination or observation including, but not limited to, tests, surveys, and monitoring to determine compliance with the act, these rules, registration conditions or orders of the department.

(5) "Interlock" means a device arranged or connected such that the occurrence of an event or condition is required before a second event or condition can occur or continue to occur.

R 333.5008 Definitions; L to O.
Rule 8. (1) "Lens dose equivalent (LDE)" means the external exposure to the lens of the eye as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm^2).
(2) "Member of the public" means an individual except when that individual is receiving an occupational dose.
(3) "Occupational dose" means the dose received by an individual in the course of employment in which the individual's assigned duties for the registrant involve exposure to sources of radiation, whether in the possession of the registrant or other person.

R 333.5009 Definitions; P and Q.
Rule 9. (1) "Physician" means an individual licensed under section 17011 or 17511 of article 15 of the public health code, 1978 PA 306, MCL 333.17011 and 333.17511 to practice medicine or osteopathic medicine.
(2) "Protective apron" means an apron made of radiation-attenuating materials used to reduce exposure to radiation.
(3) "Public dose" means the dose received by a member of the public from exposure to a radiation machine under the control of the registrant. Public dose does not include occupational dose, or doses received from a medical administration the individual has received, or from voluntary participation in medical research programs.
(4) "Quality factor" (Q) means the modifying factor, listed in tables 20-1 and 20-2, that is used to derive dose equivalent from absorbed dose.

R 333.5010 Definitions; R.
Rule 10. (1) "Radiation" means ionizing radiation. Radiation, as used in these rules, does not include non-ionizing radiation, such as radiowaves or microwaves, visible, infrared, or ultraviolet light.
(2) "Radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.05 mSv (5 mrem) in 1 hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.
(3) "Radiation machine" means a machine that emits ionizing radiation when energized.
(4) "Radiation protection supervisor" means the individual specified by the registrant who has the knowledge, authority, and responsibility for radiation protection.
(5) "Registrant" means a person who is registered with the department and is legally obligated to register with the department pursuant to these rules and the act.
(6) "Registration" for the purpose of these rules means registration of a radiation machine in writing with the department.
(7) "Research and development" means 1 of the following:
(a) Theoretical analysis, exploration, or experimentation.
(b) The extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes. Research and development does not include the internal or external administration of radiation to human beings.
(8) "Restricted area" means an area, access to which is limited by the registrant, for the purpose of protecting individuals against undue risks from exposure to sources of radiation. Restricted

area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.
(9) "Roentgen" means the special unit of exposure. One roentgen (R) equals 2.58×10^{-4} coulombs per kilogram of air.

R 333.5011 Definitions; S.
Rule 11. (1) "Shallow dose equivalent" (H_s), which applies to the external exposure of the skin or an extremity, means the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2) averaged over an area of 1 square centimeter.
(2) "SI" means the abbreviation for the international system of units.
(3) "Stochastic effect" means a health effect that occurs randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects.
(4) "Survey" means an evaluation of the radiological conditions and potential hazards incident to the use of radiation machines. When appropriate, this evaluation includes, but is not limited to, tests, physical examinations, and measurements of levels of radiation.

R 333.5012 Definitions; T to V.
Rule 12. (1) "Traceable to a national standard" means an instrument is calibrated at either the national institute of standards and technology (NIST) or at a calibration laboratory that participates in a proficiency program with the NIST at least once every 2 years and the results of the proficiency test conducted within 24 months of calibration show agreement within 3% of the national standard in the appropriate energy range.
(2) "Unrestricted area" or "uncontrolled area" means an area, access to which is neither limited nor controlled by the registrant for purposes of protection of individuals from exposure to radiation, or an area used for residential quarters.
(3) "Very high radiation area" means an area, accessible to individuals, in which radiation levels from a radiation machine could result in an individual receiving an absorbed dose in excess of 5 Gy (500 rads) in 1 hour at 1 meter from a radiation machine or 1 meter from any surface that the radiation penetrates.

R 333.5013 Definitions; W to Y.
Rule 13. (1) "Week" means 7 consecutive days starting on Sunday.
(2) "Weighting factor" w_T for an organ or tissue (T) means the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of w_T are as follows:

ORGAN DOSE WEIGHTING FACTORS

Organ or Tissue	w_T
Gonads	0.25
Breast	0.15
Red bone marrow	0.12
Lung	0.12

Thyroid	0.03
Bone surfaces	0.03
Remainder	0.30
Whole Body	1.00

(3) "Whole body" means, for purposes of external exposure, head, trunk including male gonads, arms above the elbow, or legs above the knee.
(4) "Worker" means an individual engaged in activities under a registration issued by the department and controlled by a registrant, but does not include the registrant.
(5) "Year" means the period of time beginning in January used to determine compliance with the provisions of these rules. The registrant may change the starting date of the year used to determine compliance by the registrant if the change is made at the beginning of the year. If a registrant changes in a year, the registrant shall assure that no day is omitted or duplicated in consecutive years.

EXEMPTIONS

R 333.5015 Exemptions.
Rule 15. The department may, in response to a request or on its own initiative, grant an exemption or exception from the requirements of these rules as it determines is authorized by law and shall not result in an undue hazard to public health and safety, property, or the environment.

GENERAL REQUIREMENTS

R 333.5017 Records.
Rule 17. A registrant shall comply with all record requirements of these rules including, but not limited to, the use, storage, transfer, and disposal of each radiation machine.

R 333.5018 Inspections.
Rule 18. (1) Under the authority of MCL 333.13517(1), the department may enter at all reasonable times upon private or public property to conduct compliance investigations.
(2) Under the authority of MCL 333.13517(2), the department may obtain a warrant if necessary for search of property or seizure of sources of radiation or evidence of a violation of the act or any rule or license.
(3) A registrant shall make available to the department for inspection, all records maintained pursuant to these rules.

R 333.5019 Tests.
Rule 19. (1) A registrant shall make or cause to be made, tests that the department considers appropriate or necessary including, but not limited to, tests of the following:
(a) The radiation machine.
(b) Facilities where a radiation machine is used.
(c) Radiation detection and monitoring instruments.
(d) Other equipment and devices used in connection with the use of a radiation machine.

(2) The registrant shall allow the department to perform tests that it considers appropriate to determine compliance with these rules.

R 333.5020 Units of dose.
Rule 20. (1) As used in these rules, the units of dose are the following:
(a) Gray (Gy) is the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule per kilogram (100 rads).
(b) Rad is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 erg per gram or 0.01 joule per kilogram. (0.01 Gy)
(c) Sievert (Sv) is the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sievert is equal to the absorbed dose in gray multiplied by the quality factor. (1 Sv = 100 rem)
(d) Rem is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rads multiplied by the quality factor. (1 rem = 0.01 Sv)
(2) As used in these rules, the quality factors for converting absorbed dose to dose equivalent are shown in table 20-1:
TABLE 20-1
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

*Absorbed dose in gray equal to 1 Sv or the absorbed dose in rad equal to 1 rem.

(3) If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in sievert per hour or rem per hour, as provided in subrule (2) of this rule, 0.01 Sv (1 rem) of neutron radiation of unknown energies may, for purposes of these rules, be assumed to result from a total fluence of 25 million neutrons per square centimeter incident upon the body. If sufficient information exists to estimate the approximate energy distribution of the neutrons, the registrant may use the fluence rate per unit dose equivalent or the appropriate quality factor from table 20-2 to convert a measured tissue dose in gray or rad to dose equivalent in sievert or rem.

TABLE 20-2

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} Sv^{-1})	Fluence per Unit Dose Equivalent** (Neutrons cm^{-2} rem^{-1})
(thermal)	2.5×10^{-8}	2.0	9.8×10^{10}	9.8×10^{8}
	1.0×10^{-7}	2.0	9.8×10^{10}	9.8×10^{8}
	1.0×10^{-6}	2.0	8.1×10^{10}	8.1×10^{8}
	1.0×10^{-5}	2.0	8.1×10^{10}	8.1×10^{8}
	1.0×10^{-4}	2.0	8.4×10^{10}	8.4×10^{8}
	1.0×10^{-3}	2.0	9.8×10^{10}	9.8×10^{8}
	1.0×10^{-2}	2.5	1.0×10^{11}	1.0×10^{9}
	1.0×10^{-1}	7.5	1.7×10^{10}	1.7×10^{8}
	5.0×10^{-1}	11.0	3.9×10^{9}	3.9×10^{7}
	1.0	11.0	2.7×10^{9}	2.7×10^{7}
	2.5	9.0	2.9×10^{9}	2.9×10^{7}
	5.0	8.0	2.3×10^{9}	2.3×10^{7}
	7.0	7.0	2.4×10^{9}	2.4×10^{7}
	1.0×10^{1}	6.5	2.4×10^{9}	2.4×10^{7}
	1.4×10^{1}	7.5	1.7×10^{9}	1.7×10^{7}
	2.0×10^{1}	8.0	1.6×10^{9}	1.6×10^{7}
	4.0×10^{1}	7.0	1.4×10^{9}	1.4×10^{7}
	6.0×10^{1}	5.5	1.6×10^{9}	1.6×10^{7}
	1.0×10^{2}	4.0	2.0×10^{9}	2.0×10^{7}
	2.0×10^{2}	3.5	1.9×10^{9}	1.9×10^{7}
	3.0×10^{2}	3.5	1.6×10^{9}	1.6×10^{7}
	4.0×10^{2}	3.5	1.4×10^{9}	1.4×10^{7}

*Value of quality factor at the point where the dose equivalent is maximum in a 30-centimeter diameter cylinder tissue-equivalent phantom.

**Monoenergetic neutrons incident normally on a 30-centimeter diameter cylinder tissue-equivalent phantom.

R 333.5021 Additional requirements.
Rule 21. The department may impose additional requirements on a registrant in accordance with the act, 1978 PA 368, MCL 333.1011 to 333.25211, by rule, order, or registration conditions that it considers appropriate or necessary to minimize danger to public health and safety, property, and the environment.

ENFORCEMENT REQUIREMENTS

R 333.5023 Violations.
Rule 23. (1) Under authority of MCL 333.13536, the department may obtain an injunction or other court order prohibiting a violation of the act, a rule, an order, or a registration condition issued under the act.

(2) Under the authority of MCL 333.2262, the department, in addition to taking other enforcement action, may impose a civil penalty, not to exceed $1,000 for each violation, on a person who violates the act, a rule, an order, or a registration condition issued under the act. Each day that a violation continues shall constitute a separate violation.
(3) A person who violates the act, a rule, an order, or a registration condition issued under the act may be guilty of a misdemeanor and, on conviction, may be fined, imprisoned, or both, as provided by law.

R 333.5024 Emergency orders and impounding.
Rule 24. (1) The department may issue an emergency order pursuant to MCL 333.13516. A person responsible for the radiation machine shall bear expenses incidental to the order.
(2) A radiation machine shall be subject to impoundment pursuant to MCL 333.13517. Impoundment by the department shall not relieve the owner of the responsibility for the radiation machine. A person who has a radiation machine impounded shall bear expenses incidental to the impoundment.

HEARING PROCEDURE

R 333.5026 Hearing procedure.
Rule 26. (1) Before the issuance of an order, the department shall afford an opportunity for a hearing that shall be conducted pursuant to the administrative procedures act of 1969 PA 306, MCL 24.201 to MCL 24.328.
(2) In a contested case, the department shall conduct a hearing as provided in the administrative procedures act of 1969 PA 306, MCL 24.201 to MCL 24.328.

PART 2. REGISTRATION OF RADIATION MACHINES

R 333.5031 Purpose and scope.
Rule 31. (1) This part provides for the registration of radiation machines, including particle accelerators, whether used primarily for x-ray production or other purposes.
(2) In addition to the requirements of this part, all registrants are subject to the applicable provisions of other parts of these rules.

R 333.5032 Definition.
Rule 32. As used in this part, “facility” means the location, building, vehicle, or complex under 1 administrative control, where 1 or more radiation machines are installed or located.

R 333.5033 Exemptions.
Rule 33. (1) Unless specifically covered elsewhere in these rules, electronic equipment that produces radiation incidental to its operation for other purposes is exempt from the registration and notification requirements of this part if the dose equivalent rate averaged over an area of 10 square centimeters does not exceed 5 microsieverts (0.5 mrem) per hour at 5 centimeters from any accessible surface of the equipment. The production, testing, or factory servicing of the equipment shall not be exempt.
(2) Radiation machines that are electrically disconnected pending sale, transfer of ownership, or destructive disposal or that are made inoperable are exempt from the requirements of this part. An inoperable radiation machine is one that cannot be energized when connected to a power supply without repair or modification.

(3) Domestic television receivers and video display monitors are exempt from the requirements of this part.
(4) Electron microscopes are exempt from this part if the instrument is not capable of exceeding an operating potential of 50 kilovolts.

R 333.5034 Responsibility for compliance with rules.
Rule 34. The owner or registrant, the person effectively in control of radiation machines not exempt under R 333.5033, and the individual who, pursuant to R 333.5037, is designated as the radiation protection supervisor shall be responsible for full compliance with all provisions of these rules.

R 333.5036 Shielding plan review.
Rule 36. (1) An applicant, before registration, shall submit the floor plans, shielding specifications, and equipment arrangement of all new installations, or modifications of existing installations, using a radiation machine, to the department for review and approval. Application for a radiation shielding plan review shall be completed on an application form supplied by the department according to the instructions contained in that form. Radiation shielding plans are not required to be submitted for any of the following:
(a) Dental intraoral or panoramic machines used in dental clinical facilities.
(b) Cabinet x-ray systems, analytical systems, process or control gauges, or cold-cathode gas discharge tubes.
(c) Bone densitometers.
(d) Mobile or portable radiographic machines unless routinely used in 1 location.
(e) C-arm fluoroscopic systems having a maximum source-image receptor distance of less than 45 centimeters that are used for extremity use only.
(2) The department may require the applicant to use the services of a health physicist or medical physicist to determine the shielding requirements before the department's plan review and approval.
(3) The department's approval of a plan shall not preclude the requirement of additional modifications if a subsequent analysis shows an individual could receive a dose exceeding the limits in R 333.5057 to R 333.5060.
(4) Shielding design goals of 0.1 millisievert (10 mrem) per week for controlled areas and 0.02 millisievert (2 mrem) per week and 0.02 millisievert (2 mrem) in any 1 hour for uncontrolled areas shall be applied to new facilities and to new construction in existing facilities.
(a) For the purpose of this subrule, "controlled area" means a limited access area where the occupational exposure of personnel to radiation is under the supervision of an individual in charge of radiation protection. In a controlled area, the access, occupancy, and working conditions are controlled for the purpose of radiation protection.
(b) For the purpose of this subrule, "uncontrolled area" means all areas of the facility and the surrounding environs that are not controlled for the purpose of radiation protection.
(5) For machines installed after the effective date of this part, the registrant shall maintain for inspection by the department a scale drawing of the room where a stationary radiation machine system is located. The drawing or accompanying attachments shall indicate the use of areas adjacent to the room and include an estimate of the occupancy in each area. In addition, the drawing or attachment shall include at least 1 of the following:
(a) The type and thickness of materials, or lead equivalency, of each protective barrier.
(b) The results of a survey for radiation levels at the operator's position and at pertinent points outside the room under specified test conditions.

(6) The department may withhold initial registration of a radiation machine pending receipt of either of the following:
(a) Plans and specifications for room design and shielding and approval of those plans and specifications.
(b) Documentation from the applicant that a certificate of need (CON) has been issued if the use of that machine is a covered clinical service as defined in the act.

R 333.5037 Registration of radiation machines.
Rule 37. (1) A person with 1 or more radiation machines shall do both of the following:
(a) Apply for registration of each radiation machine with the department before operating the machine. Application for registration shall be completed on forms provided by the department and shall contain all the information required by the form and associated instructions. The appropriate registration fee specified in R 333.5043 shall be submitted with the application.
(b) Designate, on the application form, a radiation protection supervisor to be responsible for radiation protection and ensure that the individual meets all of the following:
(i) Has completed a radiation safety officer training course, completed educational courses related to ionizing radiation safety, or has experience in the use and familiarity with the type of equipment used.
(ii) Is knowledgeable about the hazards and precautions in the handling of the radiation machines for which this individual is responsible.
(iii) Has read and understands the applicable requirements of these rules.
(iv) Authorizes operation of radiation machines only by individuals who have received instructions in their safe use. These instructions shall include, but are not limited to, the proper use of individual monitoring devices, the registrant's operating and safety procedures, and all other applicable rules governing the use of the radiation machine that the individual will be operating.
(v) Has the authority to make or cause to be made radiation surveys and other procedures as may be necessary to demonstrate compliance with these rules.
(vi) Has the authority to make or cause to be made changes as may be necessary to comply with these rules.
(2) A person that registers 1 or more radiation machines will be issued a department facility registration number.

R 333.5038 Machine registration tags.
Rule 38. (1) The department shall issue a registration tag for each radiation machine when it is properly registered with the department. The tag shall include a registration number uniquely assigned to that specific machine.
(2) The registrant shall apply the registration tag in a visible location on the control panel of the specified radiation machine. If applying the registration tag to the control panel is not practical, the registrant shall place the tag in another visible location on a component of the machine not likely to be replaced.
(3) The registrant shall not authorize removal of the registration tag from the radiation machine unless instructed by the department. If the tag is removed or defaced, the registrant shall notify the department and request a replacement tag. The request shall specify the tag number and machine description from the certificate of registration.

R 333.5039 Certificates of registration.

Rule 39. (1) The department shall issue a certificate of registration if it determines that an application meets the requirements of this part.
(2) The department may incorporate in the certificate of registration additional requirements in the form of registration conditions regarding the registrant's receipt, possession, and use of a radiation machine as it considers appropriate or necessary. The registrant shall comply with all registration conditions.
(3) The certificate of registration shall list all radiation machines registered at a facility.

R 333.5040 Expiration of registration.
Rule 40. Except as provided by R 333.5041(2), a registration shall expire at the end of the specified day in the month and year stated in the certificate of registration.

R 333.5041 Renewal of registration.
Rule 41. (1) The registrant shall annually file an application to renew the registration pursuant to R 333.5037 and shall submit the appropriate registration fee as specified in R 333.5043 with the application.
(2) If a registrant has filed an application to renew the registration in proper form not less than 30 days before the expiration of the existing registration, the existing registration shall not expire until the application status is determined by the department.

R 333.5042 Notice of change.
Rule 42. (1) The registrant shall notify the department in writing before making a change that would render the information contained in the application for registration, the certificate of registration, or both, no longer accurate. When a radiation machine is sold, transferred, or disposed, the notification shall specify the proposed recipient of the machine, or the location and method of disposal.
(2) A complete change in ownership, possession, or location of all machines listed on a certificate of registration terminates the certificate of record and shall require a new application for registration except as provided in subrule (4) of this rule.
(3) If there is a partial change, the department may terminate the certificate of registration of record and issue a new certificate pursuant to R 333.5039.
(4) Notwithstanding subrule (2) of this rule, replacement of all machines listed on a certificate of registration shall be considered a partial change if the name and address of the registrant and the name and address of the facility are not changed.

R 333.5043 Fees.
Rule 43. (1) Pursuant to section 13522 of the act, MCL 333.13522, fees for registration of radiation machines, fees for follow-up inspections due to noncompliance, fees for mammography machine inspections, and fees assessed in connection with mammography authorization shall be adjusted annually by an amount determined by the state treasurer to reflect the cumulative annual percentage change in the Detroit consumer price index, not to exceed 5%. As used in this part, “Detroit consumer price index” means the most comprehensive index of consumer prices available for the Detroit area from the bureau of labor statistics of the United States Department of Labor.
(2) A total or partial refund of a registration fee shall not be made due to a notice of change resulting in the deletion of tubes or machines, or in the termination of the radiation machine registration certificate before the expiration date of the registration.

(3) Specific registration fees depend on the number of x-ray tubes included in the application for registration or renewal of registration. Current radiation machine registration fees are posted on the website of the department.

R 333.5045 Approval not implied.
Rule 45. A person, in an advertisement, shall not refer to the fact that a facility is registered with the department pursuant to this part. A person shall not state or imply that the department has approved an activity under a registration.

R 333.5046 Vendor obligation; notification of transfer; duty to report.
Rule 46. (1) A person who sells, leases, transfers, lends, disposes, assembles, or installs a radiation machine in this state shall notify the department in writing, within 15 days after the end of the calendar quarter, all of the following:
(a) The name and address of the person who has received the machine.
(b) The manufacturer, model, type, and number of x-ray tubes of each radiation machine transferred.
(c) The date of transfer of each radiation machine.
(d) The department facility registration number and machine registration tag number, if the facility is registered or if the machine was previously registered with the department.
(e) If a diagnostic x-ray system contains certified components, a copy of the assembler's report, prepared in compliance with the federal performance standards for ionizing radiation products, 21 C.F.R. 1020.30(d) (June 2006), shall be submitted in place of subdivisions (a) to (c) of this subrule.
(2) A person shall not make, sell, lease, transfer, lend, assemble, or install a radiation machine or the supplies used with a machine, unless the supplies and equipment, when properly placed in operation and used, meet the requirements of these rules.

R 333.5047 Out-of-state radiation machines.
Rule 47. (1) If a person brings a radiation machine into the state for any use, that person shall register the machine with the department, comply with all applicable rules of the department, and supply the department with other information as the department may request.
(2) If a person plans to bring a radiation machine into the state for temporary use, that person shall provide written notice to the department not less than 3 working days before the machine is to be used in the state. The notice shall include all of the following:
(a) The facility registration number.
(b) The machine registration number.
(c) The nature, duration, and scope of use.
(d) The exact location or locations where the radiation machine will be used.
(e) Documentation that radiation shielding plan review information was submitted pursuant to R 333.5036.
(3) If, for a specific situation, the 3 working-day period would impose an undue hardship on the person, the department may grant permission to proceed sooner.

PART 3. STANDARDS FOR PROTECTION AGAINST RADIATION FOR USERS OF RADIATION MACHINES

GENERAL PROVISIONS

R 333.5051 Purpose.
Rule 51. (1) This part establishes standards for protection against ionizing radiation resulting from activities conducted under registrations of radiation machines issued by the department.
(2) The requirements of this part are designed to control the receipt, possession, use, and transfer of radiation machines by a registrant so that the total dose to an individual, including doses resulting from all radiation machines, does not exceed the standards for protection against radiation prescribed in this part. Nothing in this part shall be construed as limiting actions that may be necessary to protect health and safety.

R 333.5052 Scope.
Rule 52. This part applies to radiation machine registrants of the department. The limits in this part do not apply to doses due to background radiation, exposure of patients to radiation for medical diagnosis or therapy, exposure from individuals administered radioactive material, or exposure from voluntary participation in medical research programs.

R 333.5053 Definitions.
Rule 53. As used in these rules, the following definitions apply:
(a) "Declared pregnant woman" means a woman who has voluntarily informed the registrant, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.
(b) "Dosimetry processor" means an individual or an organization that processes and evaluates individual monitoring equipment to determine the radiation dose delivered to the monitoring equipment.

R 333.5055. Intentional exposure of humans.
Rule 55. (1) Nothing in these rules shall be construed as limiting the intentional exposure of patients to radiation for the purpose of medical diagnosis, medical therapy, or medical research conducted by a health practitioner licensed under article 15 of the act.
(2) Intentional exposure of individuals to radiation for diagnostic or therapeutic purposes shall be limited to supervision or prescriptions by a person licensed under article 15 of the act to provide such.
(3) Nothing in these rules shall be construed as authorization to conduct medical diagnosis, medical therapy, or medical research that is not fully consistent with the standards of practice for a health practitioner licensed under article 15 of the act.

OCCUPATIONAL DOSE LIMITS

R 333.5057 Occupational dose limits for adults.
Rule 57. (1) A registrant shall control the occupational dose to individual adults, to the following dose limits:
(a) An annual limit, which is the more limiting of the following:
(i) The effective dose equivalent of 0.05 sievert (5 rem).
(ii) The deep dose equivalent to an individual organ or tissue other than the lens of the eye of 0.5 sievert (50 rem).
(b) The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities which are the following:

(i) A lens dose equivalent of 0.15 sieverts (15 rem).
(ii) A shallow dose equivalent of 0.5 sievert (50 rem) to the skin of the whole body or to the skin of an extremity.
(2) For exposure determined by measurement with an external individual monitoring device, the deep-dose equivalent shall be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the department.
(3) The assigned deep dose equivalent shall be for the part of the body receiving the highest exposure. The assigned shallow-dose equivalent shall be the dose averaged over the contiguous 10 square centimeters of skin receiving the highest exposure.
(a) If the individual monitoring device was not in the region of highest potential exposure or the results of individual monitoring are unavailable, the deep dose equivalent, lens dose equivalent, and shallow dose equivalent may be assessed from surveys or other radiation measurements to demonstrate compliance with the occupational dose limits.
(b) When a protective apron is worn while working with medical fluoroscopic equipment and monitoring is conducted as specified in R 333.5065, the effective dose equivalent shall be determined by any of the following:
(i) When only 1 individual monitoring device is used and it is located at the neck (collar) outside the protective apron, the reported deep dose equivalent shall be the effective dose equivalent for external radiation.
(ii) When only 1 individual monitoring device is used and it is located at the neck outside the protective apron, and the reported dose exceeds 25% of the limit specified in subrule (1) of this rule, the reported deep dose equivalent value multiplied by 0.3 shall be the effective dose equivalent for external radiation.
(iii) When 2 individual monitoring devices are worn, 1 under the protective apron at the waist and the other outside the protective apron at the neck, the effective dose equivalent for external radiation shall be assigned the value of the sum of the deep dose equivalent reported for the individual monitoring device located at the waist under the protective apron multiplied by 1.5 and the deep dose equivalent reported for the individual monitoring device located at the neck outside the protective apron multiplied by 0.04.
(4) The registrant shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by another person during the current year. Requirements for determining prior occupational exposure are provided in R 333.5080.

R 333.5058 Occupational dose limits for minors.
Rule 58. The annual occupational dose limits for a minor are 10% of the annual occupational dose limits specified for an adult worker in R 333.5057.

R 333.5059 Dose equivalent to embryo or fetus.
Rule 59. (1) The registrant shall ensure that the dose equivalent to the embryo or fetus during the entire pregnancy, due to the occupational exposure of a declared pregnant woman, does not exceed 5 millisieverts (500 mrem). Records for doses to the embryo or fetus shall be kept according to R 333.5081(4).
(2) The registrant shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman to satisfy the limit in subrule (1) of this rule.
(3) The dose equivalent to the embryo or fetus is the deep dose equivalent to the declared pregnant woman.

(4) If the dose equivalent to the embryo or fetus has exceeded 4.5 millisieverts (450 mrem), when the woman declares the pregnancy to the registrant, the registrant shall be considered in compliance with subrule (1) of this rule if the additional dose equivalent to the embryo or fetus does not exceed 0.5 millisievert (50 mrem) during the remainder of the pregnancy.

RADIATION DOSE LIMITS FOR INDIVIDUAL MEMBERS OF THE PUBLIC

R 333.5060 Dose limits for individual members of the public.
Rule 60. (1) A registrant shall conduct operations in compliance with both of the following:
(a) The dose equivalent to a member of the public from the registered operation does not exceed 1 millisievert (100 mrem) in a year, excluding dose contributions from both of the following:
(i) Medical administrations the individual has received.
(ii) Voluntary participation in medical research programs.
(b) The dose in an unrestricted area from radiation machines does not exceed 0.02 millisievert (2 mrem) in any 1 hour.
(2) If a registrant allows members of the public to have access to controlled areas, the dose limits for members of the public shall apply to those individuals.
(3) The department may impose additional restrictions on radiation levels in unrestricted areas to restrict the collective dose.

R 333.5061 Compliance with dose limits for individual members of the public.
Rule 61. A registrant shall make or cause to be made, as appropriate, surveys of radiation levels in unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public in R 333.5060.

SURVEYS AND MONITORING

R 333.5063 General.
Rule 63. (1) A registrant shall make, or cause to be made, surveys that may be necessary to demonstrate compliance with the rules in this part and are reasonable under the circumstances to evaluate both of the following:
(a) The magnitude and extent of radiation levels.
(b) All potential radiological hazards.
(2) A registrant shall ensure that instruments and equipment used for quantitative radiation measurements are calibrated annually for the radiation measured, except as otherwise specified in another part of these rules or in a registration condition.
(3) This subrule applies to personnel dosimeters, including dosimeters used to measure the dose to an extremity, that require processing to determine the radiation dose and that a registrant uses to comply with R 333.5057, with other applicable provisions of these rules, or with conditions specified in a registration. This subrule does not apply to direct and indirect reading pocket dosimeters and electronic personnel dosimeters. Personnel dosimeters shall be processed and evaluated by a dosimetry processor that meets both of the following:
(a) Holds a current personnel dosimetry accreditation from the national voluntary laboratory accreditation program of the national institute of standards and technology.
(b) Is approved in this accreditation process for the type of radiation or radiations included in the national voluntary laboratory accreditation program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored.

R 333.5064 Conditions requiring individual monitoring of occupational dose.
Rule 64. A registrant shall monitor occupational exposure to radiation from radiation machines under the control of the registrant and shall supply and require the use of individual monitoring devices by all of the following:
(a) An adult likely to receive in 1 year a dose greater than 10 % of the limits specified in R 333.5057(1).
(b) A minor likely to receive in 1 year a deep dose equivalent greater than 1 millisievert (100 mrem), a lens dose equivalent greater than 1.5 millisieverts (150 mrem), or a shallow dose equivalent to the skin or to the extremities greater than 5 millisieverts (500 mrem).
(c) A declared pregnant woman likely to receive during the entire pregnancy a deep dose equivalent greater than 1 millisievert (100 mrem).
(d) An individual who enters a high or very high radiation area.
(e) An individual for whom personnel monitoring is required under other parts of these rules pertaining to specific uses of radiation machines.

R 333.5065 Location of individual monitoring devices.
Rule 65. If R 333.5064 or other parts of these rules require occupational dose monitoring for an individual, the registrant shall ensure that the individual wears an individual monitoring device or devices according to 1 of the following:
(a) An individual monitoring device used for monitoring the dose to the whole body shall be worn at the unshielded location of the whole body likely to receive the highest exposure. When a protective apron is worn, the location of the individual monitoring device is typically at the neck as described in R 333.3057(3)(b)(i).
(b) An individual monitoring device used to monitor the dose to an embryo or fetus of a declared pregnant woman, pursuant to R 333.5059(1), shall be worn at the waist under any protective apron being worn by the woman.
(c) An individual monitoring device used for monitoring the lens dose equivalent, to demonstrate compliance with R 333.5057(1)(b)(i), shall be worn at the neck, outside any protective apron being worn by the monitored individual, or at an unshielded location closer to the eye.
(d) An individual monitoring device used for monitoring the dose to the skin of the extremities, to demonstrate compliance with R 333.5057(1)(b)(ii), shall be worn on the extremity likely to receive the highest exposure. The individual monitoring device shall be oriented to measure the highest dose to the extremity being monitored.

CONTROL OF EXPOSURE IN RESTRICTED AREAS

R 333.5067 Control of access to high radiation areas.
Rule 67. (1) A registrant shall ensure that each entrance or access point to a high radiation area has 1 or more of the following control features:
(a) A device that, upon entry into the area, causes the radiation level to be reduced below the level where an individual could receive a deep dose equivalent of 1 millisievert (100 mrem) in 1 hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.
(b) A device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry.
(c) Locked entryways, except when access to the area is required, with positive control over each individual entry.

(2) In place of the controls required for a high radiation area by subrule (1) of this rule, a registrant may substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry.
(3) A registrant or applicant for a registration may apply to the department for approval of alternative methods for controlling access to high radiation areas.
(4) A registrant shall establish the controls required by subrules (1) and (3) of this rule in a way that does not prevent individuals from leaving a high radiation area.
(5) The registrant is not required to control entrance or access to rooms or other areas containing radiation machines capable of producing a high radiation area as described in subrule (1) of this rule if the registrant meets all the specific requirements for access and control specified in other applicable parts of these rules.

R 333.5068 Control of access to very high radiation areas.
Rule 68. (1) In addition to the requirements in R 333.5067, a registrant shall institute additional measures to ensure that an individual cannot gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 5 grays (500 rads) or more in 1 hour at 1 meter from a radiation machine or any surface through which the radiation penetrates. This requirement does not apply to rooms or areas in which diagnostic x-ray systems are the only source of radiation.
(2) A registrant is not required to control entrance or access to rooms or other areas containing radiation machines capable of producing a very high radiation area as described in subrule (1) of this rule if the registrant meets all the specific requirements for access and control specified in other applicable parts of these rules.

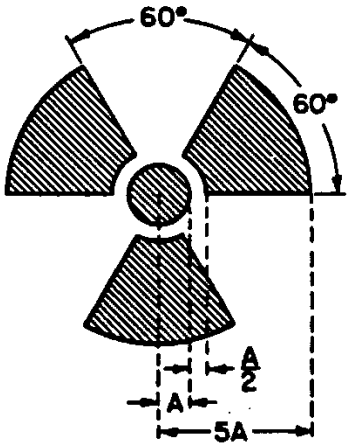
R 333.5069 Security and control of sources of radiation.
Rule 69. A registrant shall use devices or administrative procedures, or both, to prevent unauthorized use or removal of radiation machines.

PRECAUTIONARY PROCEDURES

R 333.5071 Caution signs.
Rule 71. (1) Except as otherwise authorized by the department, symbols prescribed by R 333.5072 shall use the conventional 3-bladed design as follows:

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 required in this part, a registrant may provide, on or near the required signs and labels, additional information to make individuals aware of potential radiation exposures and to minimize those exposures.

R 333.5072 Posting requirements.
Rule 72. (1) The registrant shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA".
(2) 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" or "DANGER, HIGH RADIATION AREA".
(3) The registrant shall post each very high radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "GRAVE DANGER, VERY HIGH RADIATION AREA".
(4) The registrant shall post access openings to manufacturing or process equipment such as tanks and vessels on or in which radiation machines are mounted, if an individual can gain access to the radiation beam and receive a dose to any part of his or her body greater than the applicable limits for individuals in R 333.5057 to R 333.5061. The posting shall include a conspicuous sign or signs bearing the radiation symbol and warning of the hazard.

R 333.5073 Exceptions to posting requirements.
Rule 73. A registrant is not required to post caution signs pursuant to R 333.5072 in areas or rooms in any of the following situations:
(a) The radiation machines are in the room for periods of less than 8 hours and constantly attended by an individual who takes the precautions necessary to prevent the exposure of individuals to radiation above the limits specified in this part. The area or room shall be under the registrant's control.
(b) The room is used for teletherapy and access is controlled pursuant to the applicable radiation therapy rules. Attending personnel shall take the necessary precautions to prevent the inadvertent exposure of workers, other patients, and members of the public to radiation above the limits specified in this part.
(c) The area or room contains radiation machines used for diagnosis by, or on behalf of, health practitioners licensed under article 15 of the act, MCL 333.1011 to 333.25211.

R 333.5074 Labeling radiation machines.
Rule 74. A registrant shall ensure that each radiation machine is labeled in a conspicuous manner that cautions individuals that radiation is produced when the machine is energized.

R 333.5075 Use of safety equipment.
Rule 75. (1) The requirements for safety interlocks, protective enclosures, protective clothing, precautionary labels, or other safety equipment presume the proper use of this equipment. Unauthorized override of safety interlocks or other intentional misuse or non-use of required safety equipment shall be considered willful violation of these rules.
(2) Authorized override of safety interlocks shall be requested by the radiation protection supervisor in writing from the department. The request shall include justification, precautionary procedures during override, and statement of immediate supervision by the radiation protection supervisor or his or her authorized representative. Prior approval by the department is required. The approval may be granted by written condition on the registration certificate or by telephone followed by written confirmation from the department.

RECORDS

R 333.5077 General provisions for records.
Rule 77. (1) A registrant shall use either the international system of units (SI) gray, sievert, and coulomb per kilogram, or the special units rad, rem, and roentgen, including multiples and subdivisions, and shall clearly indicate the units of all quantities on records required by this part.
(2) The registrant shall make a clear distinction among the quantities entered on the records required by these rules. The dose to an individual shall be specified in quantities such as the effective dose equivalent, shallow dose equivalent, lens dose equivalent, or deep dose equivalent.

R 333.5079 Records of surveys and calibrations.
Rule 79. (1) A registrant shall retain records of the results of surveys and calibrations required by R 333.5063 for 3 years after the record is made.
(2) A registrant shall maintain records of the results of surveys used to determine exposures, in the absence of or in combination with individual monitoring data, in the assessment of individual dose equivalents. A registrant shall retain these records until the department terminates the registration requiring the record.

R 333.5080 Determination and records of prior occupational dose.
Rule 80. (1) For each individual likely to receive an annual occupational dose requiring monitoring under R 333.5064, the registrant shall determine the occupational radiation dose received during the current year. To comply, a registrant may do any of the following:
(a) Accept, as a record of an individual's occupational dose, a written and signed statement from the individual, or from the individual's most recent employer for work involving radiation exposure, that documents the nature and the amount of occupational dose the individual may have received during the current year.
(b) Accept, as the record of cumulative radiation dose, an up-to-date department Form MIOSHA-RSS-101, or equivalent, signed by the individual and countersigned by either an appropriate official of the most recent employer for work involving radiation exposure, or by the individual's current employer if the individual is not employed by the registrant.

(c) Obtain reports of the individual's dose equivalents from the most recent employer for work involving radiation exposure, or the individual's current employer if the individual is not employed by the registrant, by telephone, telegram, facsimile, other electronic media, or letter. The registrant shall request a written verification of the dose data if the authenticity of the reports cannot be established.
(3) The registrant shall record the exposure history of each individual, as required by subrule (1) of this rule, on department Form MIOSHA-RSS-101, or other clear and legible record, that includes all the information required on that form. The form or record shall show each period in which the individual received occupational exposure to radiation. For each period for which the registrant obtains reports, the registrant shall use the dose shown in the report in preparing department Form MIOSHA-RSS-101 or equivalent. For a period in which the registrant does not obtain a report, the registrant shall place a notation on department Form MIOSHA-RSS-101, or equivalent, indicating the periods for which data are not available.
(4) If the registrant cannot obtain a complete record of an individual's occupational dose for the current year, the registrant shall assume, in establishing administrative controls pursuant to R 333.5057(4) for the current year, that the allowable dose limit for the individual is reduced by 12.5 millisieverts (1,250 mrem) for each calendar quarter for which records are unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure.
(5) The registrant shall retain the records on department Form MIOSHA-RSS-101, or equivalent, until the department terminates each pertinent registration requiring this record. The registrant shall retain records used in preparing department Form MIOSHA-RSS-101, or equivalent, for 3 years after the record is made.

R 333.5081 Records of individual monitoring results.
Rule 81. (1) A registrant shall maintain records of doses received by all individuals for whom monitoring is required pursuant to R 333.5064. When applicable, these records shall include 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) The registrant shall make entries of the records specified in subrule (1) of this rule at least annually.
(3) The registrant shall maintain the records specified in subrule (1) of this rule on department Form MIOSHA-RSS-102, pursuant to the instructions for department Form MIOSHA-RSS-102, or in clear and legible records containing all the information required by department Form MIOSHA-RSS-102.
(4) The registrant shall maintain the records of dose to an embryo or fetus with the records of dose to the declared pregnant woman. The declaration of pregnancy shall also be kept on file, but may be maintained separately from the dose records.
(5) The registrant shall retain the required form or record until the department terminates each pertinent registration requiring the record.

R 333.5082 Records of dose to individual members of the public.
Rule 82. (1) A registrant shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public as required by R 333.5060.
(2) A registrant shall retain the records required by subrule (1) of this rule until the department terminates each pertinent registration requiring the record.

R 333.5083 Records of testing entry control devices for very high radiation areas.

Rule 83. (1) A registrant shall maintain records of tests performed on entry control devices for very high radiation areas. These records shall include the date, time, and results of each test.
(2) The registrant shall retain the records required by subrule (1) of this rule for 3 years after the record is made.

R 333.5084 Form of records.
Rule 84. (1) A record required by these rules shall be legible, readily identifiable, and retrievable throughout the specified retention period. The record shall be 1 of the following:
(a) The original.
(b) A reproduced copy.
(c) An electronic copy stored in an electronic recordkeeping system.
(d) A microform if it is authenticated by authorized personnel and is capable of producing a clear copy throughout the required retention period.
(2) Records, such as letters, drawings, and specifications, shall include all pertinent information, such as stamps, initials, and signatures.
(3) The registrant shall maintain adequate safeguards against tampering with and loss of records.

NOTIFICATIONS AND REPORTS

R 333.5086 Notifications and reports of theft or loss of registered radiation machines.
Rule 86. (1) A registrant shall notify the department by telephone of a stolen, lost, or missing radiation machine within 10 days after its absence becomes known.
(2) A registrant required to notify the department under subrule (1) of this rule shall, within 30 days after making the telephone notification, make a written report to the department containing all of the following information:
(a) A description of the radiation machine involved, including the manufacturer and model, and the registration tag number of the radiation machine.
(b) A description of the circumstances under which the loss or theft occurred.
(c) A statement of disposition, or probable disposition, of the radiation machine involved.
(d) Exposures of individuals to radiation, the circumstances under which the exposures occurred, and the possible total effective dose equivalent to individuals in unrestricted areas.
(e) Actions that have been taken, or will be taken, to recover the radiation machine.
(f) Actions taken or planned to prevent a recurrence of the loss or theft of the radiation machine.
(3) After filing the written report, the registrant shall make an additional written report to the department containing any additional substantive information regarding the loss or theft within 30 days after the registrant learns of the new information.
(4) The registrant shall prepare a report filed with the department pursuant to this rule so that the names of individuals who may have received exposure to radiation are contained in a separate and detachable part of the report.

R 333.5087 Notification of incidents.
Rule 87. (1) In addition to any other requirements for notification, a registrant shall immediately notify the department of an event involving a radiation machine possessed by the registrant that may have caused or threatens to cause an individual to receive any of the following:
(a) An effective dose equivalent of 0.25 sievert (25 rem) or more.
(b) A lens dose equivalent of 0.75 sievert (75 rem) or more.
(c) A shallow dose equivalent to the skin or extremities of 2.5 grays (250 rads) or more.

(2) Within 24 hours of discovery of the event, a registrant shall notify the department of an event involving a registered radiation machine possessed by the registrant that may have caused, or threatens to cause, an individual to receive, in a period of 24 hours, any of the following:
(a) An effective dose equivalent exceeding 0.05 sievert (5 rem).
(b) A lens dose equivalent exceeding 0.15 sievert (15 rem).
(c) A shallow dose equivalent to the skin or extremities exceeding 0.5 sievert (50 rem).
(3) Registrants shall make the notifications required by subrules (1) and (2) of this rule by telephone to the department and shall confirm the notification within 24 hours by e-mail, facsimile, or overnight mail to the department.
(4) The registrant shall prepare the written confirmation filed with the department pursuant to this rule so that the names of individuals who have received an exposure to radiation are contained in a separate and detachable part of the written confirmation.

R 333.5088 Reports of exposures and radiation levels exceeding limits.
Rule 88. (1) In addition to the notification required by R 333.5087, a registrant shall submit a written report to the department within 30 days after learning of any of the following occurrences:
(a) An event requiring notification under R 333.5087.
(b) A dose exceeding any of the following:
(i) The occupational dose limits for adults in R 333.5057.
(ii) The occupational dose limits for a minor in R 333.5058.
(iii) The limit for an embryo or fetus of a declared pregnant woman in R 333.5059.
(iv) The limits for a member of the public in R 333.5060.
(v) Any applicable limit in the registration.
(c) Levels of radiation in either of the following conditions:
(i) A restricted area exceeding an applicable limit in the registration.
(ii) An unrestricted area exceeding 10 times an applicable limit in this part or in the registration, whether or not this involves a dose to an individual in excess of the limits in R 333.5060.
(2) A written report required by subrule (1) of this rule shall include, as appropriate, all of the following:
(a) The registrant's name, address, and facility registration number.
(b) A description of the event, including the possible cause and the manufacturer and model number, if applicable, of any equipment that failed or malfunctioned.
(c) The location of the event.
(d) The date and time of the event.
(e) The results of any evaluations or assessments, including an estimate of each individual's dose and the levels of radiation involved.
(f) Actions taken or planned to prevent a recurrence, including the schedule for achieving conformance with applicable limits and applicable registration conditions.
(3) After filing a report required by this rule, the registrant shall make an additional written report to the department containing any additional substantive information regarding the event within 30 days after the registrant learns of the new information.
(4) A report filed with the department under this rule shall include the name, a unique identification number or social security number as appropriate, and the date of birth of each overexposed individual. The report shall be prepared so that the information is contained in a separate and detachable part of the report and shall be clearly labeled "Protected Information: Not for Public Disclosure."

R 333.5089 Reports to individuals of exceeding dose limits.
Rule 89. When R 333.5088 requires a registrant to report to the department, the registrant shall also provide to any affected individual a report on his or her exposure data included in the report submitted to the department. This report shall be transmitted no later than the transmittal to the department.

PART 4. NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS FOR USERS OF RADIATION MACHINES

R 333.5091 Purpose and scope.
Rule 91. This part establishes requirements for notices, instructions and reports by registrants to individuals engaged in activities associated with radiation machines and options available to these individuals in connection with department inspections of registrants to determine compliance with the act and rules regarding radiological working conditions. The rules in this part apply to all persons who receive, possess, use, own, or transfer radiation machines registered with the department under R 333.5031 to R 333.5047.

R 333.5092 Posting of notices to workers.
Rule 92. (1) A registrant shall post current copies of the following documents or a notice that describes each document and states where it may be examined:
(a) The rules in this part and R 333.5051 to R 333.5089.
(b) The certificate of registration and all conditions or documents incorporated into the registration by reference.
(c) The operating procedures applicable to activities under the registration.
(2) A registrant shall post a notice of violation involving radiological working conditions, a proposed imposition of a civil penalty or order issued under R 333.5023 or R 333.5024, and required responses from the registrant.
(3) A registrant shall post department Form MIOSHA-RSS-100 “Notice to Employees” as required by these rules.
(4) A registrant shall conspicuously post documents, notices, and forms as required by this rule in a sufficient number of places to allow individuals engaged in work under the registration to observe them on the way to or from work locations to which the document applies, and shall replace a document if it is defaced or altered.
(5) A registrant shall post documents pursuant to subrule (2) of this rule within 5 working days after receipt of the documents from the department. The registrant's response shall be posted within 5 working days after dispatch from the registrant. These documents shall be posted for a minimum of 5 working days or until the violation has been corrected, whichever is later.

R 333.5093 Instructions to workers.
Rule 93. (1) A registrant shall ensure that each individual, who during employment is likely to receive in a year an occupational dose greater than 1 millisievert (100 mrem), shall be the following:
(a) Instructed in the risks associated with exposure to radiation to the individual and potential offspring and in precautions or procedures to minimize exposure.
(b) Instructed in, and required to observe, to the extent within the worker's control, the applicable provisions of these rules for the protection of personnel from exposures to radiation.

(c) Instructed in his or her responsibility to report promptly to the registrant a condition that may constitute, lead to, or cause a violation of the act, these rules, a registration condition, or unnecessary exposure to radiation.
(d) Instructed in the appropriate response to warnings made due to an unusual occurrence or malfunction that may involve exposure to radiation.
(e) Advised as to the radiation exposure reports that workers shall be provided pursuant to R 333.5094.
(2) A registrant shall keep records of the instructions described in this rule.
(3) The extent of these instructions shall be commensurate with the potential radiological hazards in the workplace.

R 333.5094 Notifications and reports to individuals.
Rule 94. (1) A registrant shall report radiation exposure data for an individual as specified in this rule. The information reported shall include data and results obtained pursuant to these rules, orders, or registration conditions, as shown in records kept by the registrant pursuant to R 333.5081. A notification and report shall be in writing and include all of the following:
(a) The name of the registrant, the name of the individual, and the individual's unique identification number or social security number.
(b) The individual's exposure information.
(c) The following statement:
"This report is provided to you pursuant to Part 4 of the Michigan Department of Licensing and Regulatory Affairs rules entitled 'Ionizing Radiation Rules Governing the Use of Radiation Machines'. You should keep this report for future reference."
(2) A registrant shall make dose information available to workers as shown in records kept by the registrant pursuant to R 333.5081. A registrant shall provide an annual report to each individual monitored pursuant to R 333.5064 of the dose received in that monitoring year for either of the following reasons:
(a) The individual's occupational dose exceeds 1 millisievert (100 mrem) effective dose equivalent or 1 millisievert (100 mrem) to an individual organ or tissue.
(b) The individual requests his or her annual dose report.
(3) At the request of a worker formerly engaged in work controlled by the registrant, the registrant shall provide a written report of the worker's exposure to radiation machines. The report shall include the dose record for each year the worker was required to be monitored pursuant to R 333.5064. The report shall be provided within 30 days from the date of the request, or within 30 days after the dose of the individual has been determined by the registrant, whichever is later. The report shall cover the period of time the worker's activities involved exposure to radiation machines. The report shall include the dates and locations of work associated with radiation machines in which the worker participated during this period.
(4) When a registrant is required pursuant to R 333.5087 or R 333.5088 to report to the department an exposure of an individual to radiation, the registrant shall also provide the individual a written report of the exposure data included in the report. This report shall be transmitted at a time not later than the transmittal to the department.
(5) At the request of a worker who is terminating employment with the registrant in work involving exposure to radiation during the current year, or at the request of a worker who, while employed by another person, is terminating a work assignment involving radiation exposure in the registrant's facility during the current year, each registrant shall provide at termination to the worker, or to the worker's designee, a written report of the radiation dose received by that worker from operations of the registrant during the current year. If the most recent individual

monitoring results are not available, a written estimate of the dose shall be provided. Estimated doses shall be clearly indicated as estimated doses.

R 333.5096 Presence of representatives of registrants and workers during inspection.
Rule 96. (1) A registrant or an applicant for a registration shall allow the department at all reasonable times, the opportunity to inspect machines, activities, facilities, premises, and records under these rules.
(2) During an inspection, the registrant shall allow department inspectors to consult privately with workers as specified in R 333.5097. The registrant may accompany department inspectors at times other than the private consultation with workers.
(3) If the workers have authorized an individual to represent them during department inspections, the registrant shall notify the inspectors of the authorization and shall permit the workers' representative to accompany the inspectors during the inspection of physical working conditions.
(4) A worker's representative shall be routinely engaged in work under control of the registrant and shall have received instructions as specified in R 333.5093.
(5) If there is no resulting interference with the conduct of the inspection, different representatives of registrants and workers may accompany the inspectors during different phases of an inspection. However, only 1 workers' representative at a time may accompany the inspectors.
(6) With the approval of the registrant and the workers' representative, an individual who is not routinely engaged in work under control of the registrant, for example, a consultant to the registrant or to the workers' representative, may accompany department inspectors during the inspection of physical working conditions.
(7) Department inspectors may refuse to permit accompaniment by an individual who deliberately interferes with a fair and orderly inspection.
(8) Unless previously authorized by the registrant, a worker's representative shall not have access to an area containing proprietary information.

R 333.5097 Consultation with workers during inspections.
Rule 97. (1) Department inspectors may consult privately with workers concerning matters of occupational radiation protection and other matters related to applicable provisions of these rules to the extent that the inspectors consider necessary for the conduct of an effective and thorough inspection.
(2) During an inspection, a worker may report privately to the inspectors, either orally or in writing, a past or present condition that the worker believes may have contributed to or caused a violation of the act, these rules, a registration condition, or unnecessary exposure of an individual to radiation from machines under the registrant's control. If this notice is in writing, the worker shall comply with the requirements of R 333.5098(1).
(3) The provisions of subrule (2) of this rule shall not be interpreted as authorization to disregard instructions pursuant to R 333.5093.

R 333.5098 Requests by workers for inspections.
Rule 98. (1) A worker or a representative of workers who believes that a violation of the act, these rules, or registration conditions exists or has occurred regarding radiological working conditions may request an inspection of the facility by the department. The request shall be in writing, describe the circumstances of the perceived violation or condition, and be signed by the worker or the representative of the workers. The department shall provide a copy of the request

to the registrant before or during the inspection. At the request of the worker, the department shall protect the worker's name and the name of individuals referred to in the request, except for good cause shown.
(2) If, upon receipt of a request for an inspection, the department determines that the complaint meets the requirements of subrule (1) of this rule, and that there are reasonable grounds to believe that the alleged violation exists or has occurred, an inspection shall be made as soon as practical to determine if the alleged violation exists or has occurred. An inspection authorized by this rule need not be limited to matters referred to in the complaint.

R 333.5100 Inspections not warranted; informal review.
Rule 100. (1) If the department determines, with respect to a complaint filed pursuant to R 333.5098, that an inspection is not warranted because there are no reasonable grounds to believe that a violation exists or has occurred, the department shall notify the complainant in writing of the determination. To request a review of the determination the claimant shall submit a written statement of position to the department director. The department director, or his or her designated representative, shall send the registrant a copy of the statement by certified mail, excluding, at the request of the complainant, the name of the complainant. The registrant may submit an opposing written statement of position to the department director. The department director, or his or her designated representative, shall send the complainant a copy of the statement by certified mail.
(2) At the request of the complainant, the department may hold an informal conference in which the complainant and the registrant may orally present their views. An informal conference may also be held at the request of the registrant, but disclosure of the identity of the complainant shall be made only following receipt of written authorization from the complainant. After considering all written and oral views presented, the department director, or designated representative shall affirm, modify, or reverse the determination of the department and provide the complainant and the registrant a written notification of the decision. The notification shall include a discussion of the basis for the decision.
(3) If, upon receipt of a request for an inspection, the department determines that an inspection is not warranted because the complaint does not meet the requirements of R 333.5098(1), the department shall notify the complainant in writing of the determination. The determination shall be without prejudice to the filing of a new complaint meeting the requirements of R 333.5098(1).

R 333.5101 Employee protection.
Rule 101. Employment discrimination by a registrant, or contractor or subcontractor of a registrant against an employee for engaging in protected activities under this part is prohibited.

PART 6. INDUSTRIAL RADIOGRAPHIC OPERATIONS AND INSTALLATIONS

R 333.5281 Purpose and scope.
Rule 281. (1) This part establishes radiation safety requirements for persons utilizing radiation machines for industrial radiography and a classification system for industrial radiographic installations and use.
(2) This part applies to all registrants who use radiation machines for industrial radiography. Nothing in this part applies to the use of radiation machines by a health practitioner licensed under article 15 of the act.
(3) In addition to the requirements of this part, all registrants are subject to the applicable provisions of the other parts of these rules.

R 333.5282 Definitions.
Rule 282. As used in this part:
(a) "Industrial radiography" means the examination of the macroscopic structure of materials by nondestructive methods utilizing radiation machines.
(b) "Installation" means a location, having boundaries specified by the registrant, where for a period of more than 30 days 1 or more radiation machines are used. A part of a building, an entire building, a plant, or plant site may be designated as an installation.
(c) "Radiographer" means an individual who performs or who, in attendance at the site where radiation machines are being used, personally supervises class D radiographic operations and who is responsible to the registrant for assuring compliance with the requirements of these rules and all registration conditions.
(d) "Radiographer's assistant" means an individual who, under the personal supervision of a radiographer, uses radiation machines or survey instruments in class D radiographic operations.

CLASSIFICATION

R 333.5293 Class enumeration.
Rule 293. (1) For registration and approval purposes, industrial radiographic installations shall be classified as class AA, class A, class B, or class C.
(2) For the purpose of registering and approving industrial radiography and radiation machines intended for limited use at temporary job site locations, this use shall be classified as a class D operation.

R 333.5294 Class AA installations.
Rule 294. (1) In class AA installations the radiation machine and objects exposed thereto shall be contained within a permanent enclosure.
(2) The enclosure shall be constructed such that the radiation dose rate at a distance of 5 centimeters from any point on the external surface shall not exceed 0.02 millisievert per hour (2 mrem/h). The dose rate shall be measured with the source of radiation placed at the position of closest source-wall distance that is radiographically usable and under conditions of maximum radiation output permitted by the design or operating characteristics of the radiation machine.
(3) Mechanical or electrical limiters shall limit movement or alignment of the radiation machine within the enclosure if necessary to comply with subrule (2) of this rule.
(4) A personnel barrier posted pursuant to R 333.5067 to R 333.5072 restricting access to the roof of the enclosure shall meet the requirement of subrule (2) of this rule.
(5) Reliable interlocks shall be provided which will prevent anyone from opening the enclosure while the radiation machine is on or which will terminate machine operation should anyone open the enclosure.
(6) Enclosures of sufficient size to permit human occupancy shall be provided with visible signals or audible signals, or both, within the enclosure, which are activated a minimum of 5 seconds before radiation machine activation. Individuals shall at all times be able to escape from within the enclosure.
(7) Individuals shall not be permitted to remain within the enclosure while the radiation machine is in operation.
(8) Protective enclosures and equipment shall be kept in good repair.
(9) Industrial fluoroscopy shall meet the requirements of class AA installations.

(10) Notwithstanding the provisions of subrule (2) of this rule, the enclosure for industrial fluoroscopy shall be constructed such that the radiation dose rate at a distance of 5 centimeters from any accessible point on the external surface shall not exceed 0.005 millisievert per hour (0.5 mrem/h) under conditions of maximum radiation output permitted by the design or operating characteristics of the installation.
(11) Industrial cabinet radiography conducted in enclosures of insufficient size to permit human occupancy shall meet the requirements of class AA installations.
(12) Notwithstanding the provisions of subrule (2) of this rule, the enclosure for industrial cabinet radiography of insufficient size to permit human occupancy shall be constructed such that the radiation dose rate at a distance of 5 centimeters from any accessible point on the external surface shall not exceed 0.005 millisievert per hour (0.5 mrem/h) under conditions of maximum radiation output permitted by the design or operating characteristics of the installation.
(13) For class AA enclosures of sufficient size to permit human occupancy, a personnel radiation dosimeter shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(14) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs for inspection by the department.
(15) Class AA approval permits unlimited use at maximum capacity.

R 333.5296 Class A installations.
Rule 296. (1) Class A installations shall comply with all requirements of R 333.5294 except for a permissible dose rate of 0.07 millisievert per hour (7 mrem/h) at any accessible external point.
(2) A personnel radiation dosimeter shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(3) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs for inspection by the department.
(4) Class A approval permits unlimited use at maximum capacity.

R 333.5297 Class B installations.
Rule 297. (1) Class B installations shall comply with all requirements of R 333.5296.
(2) Radiation machine current and potential controls shall be mechanically or electrically limited so as not to exceed the normal operating conditions as specified by the registrant at the time of application for registration.
(3) Class B approval permits unlimited use under normal operating conditions as specified by subrule (2) of this rule.

R 333.5298 Class C installations.
Rule 298. (1) Class C installations shall comply with all requirements of R 333.5296 except for a permissible dose rate of 0.5 millisievert (50 mrem) per hour at any accessible external point.
(2) The maximum weekly exposure time of radiation machines within the enclosure shall be established by the department under the conditions specified by the registrant at the time of application.
(3) Warning signs shall be posted in those areas outside the enclosure in which the radiation dose rate at any accessible external point exceeds 0.02 millisievert per hour (2 mrem/h). The dose rate shall be measured with the radiation machine tube placed at position of nearest source-wall distance that is radiographically usable under conditions of maximum radiation output permitted by the design or limited operating characteristics of the radiation machine.

R 333.5299 Class D operations.
Rule 299. (1) Industrial radiography conducted under conditions not meeting the provisions and requirements of R 333.5294 to R 333.5298 shall be classified as class D operations and shall not be operated longer than 30 days unless written authorization is granted by the department.
(2) Written authorization may be granted by the department for class D operations longer than 30 days but not longer than 6 months when an undue and unnecessary hardship may result from the 30-day limitation. Written request by the registrant for this authorization is required and shall describe the hardship involved as well as provide written assurance of compliance with the requirements of these rules for class D operations.
(3) Notwithstanding subrules (1) and (2) of this rule, a registrant routinely engaged in providing industrial radiography services with mobile or portable radiation machines at temporary job site locations may conduct such class D operations without time limitation subject to all of the following conditions:
(a) The registrant shall give written notice to the department at least 2 working days before starting radiographic work at a job site. The notice shall include the radiographer's name; the machine registration number; the nature, duration, and scope of use; and the exact location of each job site. If the 2 work-day period would impose an undue hardship on the registrant, upon application to the department, he or she may arrange for other notification to comply with the intent of this requirement.
(b) These class D operations shall be limited to locations and circumstances which cannot meet the provisions and requirements of permanent installation classification without undue and unnecessary hardship.
(c) A copy of written operating and emergency procedures shall be filed with and approved by the department.
(d) Upon reasonable notice from the department, the registrant shall submit to the department or otherwise make available copies of specific records pertaining to radiographic operations and personnel conducting these operations within this state.
(4) A fence, rope, or other suitable barrier shall be erected along the 0.05 millisievert per hour (5 mrem/h)contour line during class D radiographic operations to exclude unauthorized individuals from the radiation area.
(5) Notwithstanding the requirements of R 333.5073, the radiation area and high radiation area shall be posted with caution signs as specified in R 333.5067 to R 333.5072.
(6) A registrant shall not permit an individual to act as a radiographer or as a radiographer's assistant unless, at all times during radiographic operation, the individual wears a long-term monitoring device such as a film badge or TLD and a short-term monitoring device such as a pocket dosimeter or pocket chamber. Pocket dosimeters and pocket chambers shall be capable of measuring doses from 0 to at least 2 millisieverts (200 mrem). A long-term monitoring device shall be assigned to and worn by only 1 individual.
(7) Pocket dosimeters and pocket chambers shall be read and doses recorded daily. A film badge or similar device shall be immediately processed if a pocket chamber or pocket dosimeter is discharged beyond its range. All personnel exposure reports and records of pocket dosimeter and pocket chamber readings shall be maintained for inspection by the department.
(8) Written operating and emergency procedures shall be available at each class D radiographic operation.

REQUIREMENTS FOR CLASS D RADIOGRAPHIC OPERATIONS

R 333.5302 Operating and emergency procedures.
Rule 302. A registrant's written operating and emergency procedures for class D radiographic operations shall include instructions in at least the following:
(a) The use of radiation machines to be employed such that an individual is not likely to be exposed to radiation doses in excess of the limits established in R 333.5057 to R 333.5061.
(b) Methods and occasions for conducting radiation surveys.
(c) Methods for controlling access to radiographic areas.
(d) Personnel monitoring and the use of individual monitoring devices.
(e) Transportation to field locations, including packing of radiation machines in the vehicles, posting of vehicles, and control of radiation machines during transportation.
(f) Minimizing exposure of persons in the event of an accident.
(g) Procedure for notifying proper persons in the event of an accident.
(h) Maintenance of records.
(i) Inspection and maintenance of radiation machines.

R 333.5305 Security.
Rule 305. (1) During each class D radiographic operation, the radiographer or radiographer's assistant shall maintain a direct surveillance of the operation to protect against unauthorized entry into a high radiation area, except where the high radiation area is equipped with interlocks as described in R 333.5294 (5), or where the high radiation area is locked to protect against unauthorized or accidental entry.
(2) A radiographer or radiographer's assistant shall not perform or permit class D radiographic operation unless all individuals present in or entering the resulting radiation area are wearing individual monitoring devices.

R 333.5306 Radiation surveys and survey records.
Rule 306. (1) A class D radiographic operation shall not be conducted unless calibrated and operable radiation survey instrumentation, as described in R 333.5307, is available and used at each site where radiographic exposures are made.
(2) For class D radiographic operations, a physical radiation survey shall be conducted to determine that the radiation machine is off before each entry into the radiographic exposure area.

R 333.5307. Radiation survey instruments.
Rule 307. (1) A registrant shall maintain calibrated and operable radiation survey instruments to make physical radiation surveys as required by R 333.5306 and R 333.5063. A radiation survey instrument shall be calibrated at least annually and after each instrument servicing. A record of the calibration shall be maintained for examination by the department.
(2) Instrumentation required by this rule shall have a range such that 0.02 millisievert per hour (2 mrem/h) through 0.01 sievert per hour (1 rem/h) can be measured and shall be capable of measuring radiation of the energies and at the dose rates to be encountered.
(3) During repair or calibration of survey instruments required by this rule, spare operable and calibrated instruments shall be provided or class D radiographic operations shall be terminated pursuant to R 333.5306(1).

R 333.5308 Utilization logs.
Rule 308. A registrant shall maintain for inspection by the department current logs, which contain all of the following information for each radiation machine:
(a) The machine registration number.

(b) The identity of the radiographer to whom the machine is assigned.
(c) The locations where used and dates of use.
(d) The signature or initials of the individual certifying each entry.

R 333.5309 Limitations for radiographers and radiographer assistants.
Rule 309. (1) A registrant shall not permit an individual to act as a radiographer until all of the following have been met:
(a) The individual was instructed in the subjects outlined in table 309 and has demonstrated understanding of these subjects.

TABLE 309
Instruction of radiographers

I Fundamentals of Radiation Safety

A. Characteristics of x-radiation
B. Units of radiation dose
C. Hazards of excessive radiation exposure
D. Levels of radiation from radiation machines
E. Methods of controlling radiation dose
1. Working time
2. Working distances
3. Shielding

II Radiation Detection Instrumentation to be Used

A. Use of radiation survey instruments
1. Operation
2. Calibration
3. Limitations
B. Survey techniques
C. Use of individual monitoring devices

III. Radiographic Equipment to be Used

A. Operation and control of x-ray equipment

IV. The Requirements of Pertinent State Regulations

V. The Registrant's Written Operating and Emergency Procedures

VI. Registration Conditions

(b) The individual received copies of and instruction in the rules contained in this part and the applicable provisions sections of R 333.5051 to R 333.5089, registration conditions, and the registrant's operating and emergency procedures, and has demonstrated an understanding of these subjects.
(c) The individual demonstrated competence to use the radiation machine and survey instruments which will be employed in his or her assignment.

(2) A registrant shall not permit an individual to act as a radiographer's assistant until both of the following have been met:
(a) The individual received copies of and instruction in the registrant's operating and emergency procedures, and has demonstrated an understanding of these procedures.
(b) The individual demonstrated competence to use, under the personal supervision of the radiographer, the radiation machines and radiation survey instruments which will be employed in his or her assignment.

PART 7. MEDICAL X-RAY INSTALLATIONS

R 333.5311 Purpose and scope.
Rule 311. (1) This part establishes requirements governing the use of x-radiation in medicine, osteopathy, chiropractic, and podiatry.
(2) This part applies to all registrants who use x-radiation as a health practitioner or on behalf of a health practitioner licensed under article 15 of the act for the intentional exposure of humans.
(3) In addition to the requirements of this part, all registrants who use x-radiation as a health practitioner or on behalf of a health practitioner licensed under article 15 of the act are subject to all applicable provisions of these rules.

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R 333.5312 X-ray equipment.
Rule 312. (1) The tube housing shall be of the therapeutic type.
(2) Permanent diaphragms or cones used for collimating the useful beam shall afford the same degree of attenuation as is required of the housing.
(3) Adjustable or removable beam-limiting devices shall transmit not more than 5% of the useful beam as determined at the maximum tube potential and with maximum treatment filter.
(4) Filters shall be so mounted as to prevent their movement during the treatment.
(5) The filter slot shall be so constructed that the radiation escaping through it does not produce an exposure rate exceeding 1 R/h at 1 meter, or if the patient is likely to be exposed to radiation escaping from the slot, 30 R/h at 5 centimeters (2 inches) from the external opening.
(6) A removable filter shall be permanently marked with its thickness and material.
(7) A filter indication system shall be used on therapy machines which use changeable filters and are manufactured after the effective date of these rules. It shall indicate, from the control panel, the presence or absence of a filter and it shall be designed to permit easy recognition of the filter in place.
(8) The x-ray tube shall be so mounted that it cannot turn or slide with respect to the housing aperture. A reproducible means of measuring the focal spot to patient distance shall be provided.
(9) Means to immobilize the tube housing during stationary portal treatment shall be provided.
(10) An easily discernible indicator which shows whether or not x-rays are being produced shall be on the control panel.
(11) Beam monitoring devices shall be fixed in the useful beam to indicate an error due to incorrect filter, tube current, or tube potential, unless the device introduces more filtration than is clinically acceptable.
(12) A suitable exposure control device, such as an automatic timer, exposure meter, or dose meter, shall be provided to terminate the exposure after a preset time interval or preset exposure or dose limit. If a timer is used, it shall permit accurate presetting and determination of exposure

times as short as 1 second. Means for the operator to terminate the exposure at any time shall be provided.
(13) Mechanical or electrical stops, or both shall be provided to insure that the useful beam is oriented only toward primary barriers.
(14) Interlocks shall be provided so that, when a door to the treatment room is opened, the machine turns off automatically or the radiation level within the room is reduced to an average of not more than 2 mR/h and a maximum of 10 mR/h at a distance of 1 meter in any direction from the source. After the shut-off or reduction in exposure rate, it shall be possible to restore the machine to full operation only from the control panel.
(15) The x-ray control circuit shall be so designed that it is not possible to energize the x-ray tube to produce x-rays without resetting the x-ray "ON-OFF" switch at the control panel.
(16) When the relationship between the beam interceptor (when present) and the useful beam is not permanently fixed, mechanical or electrical stops shall be provided to ensure that the beam is oriented only toward primary barriers.
(17) X-ray machines with electron beam extraction capability shall be provided with such additional safety devices as determined necessary and specified in writing by the department to prevent accidental electron beam exposure.
(18) To reduce the electron contamination of high energy treatment beams, shadow trays, or other accessories placed in the primary beam shall be placed at a sufficient distance from the patient that the electron contamination contribution to the skin dose is minimal.

R 333.5315 Enclosures.
Rule 315. (1) An enclosure shall be a permanent part of the building or equipment. Portable protective barriers shall not be used for permanent installations.
(2) The degree of protection required for an enclosure shall be determined by the workload, use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance. The design shall be subject to approval by the department.
(3) All wall, ceiling, and floor areas that can be irradiated by the useful beam plus an additional area extending at least 30 centimeters (1 foot) beyond shall be provided with a primary protective barrier.
(4) For equipment capable of operating above 150 kVp, the control station shall be outside of the therapy room.
(5) The enclosure shall be so constructed that individuals may at all times be able to escape from within.
(6) If the radiation exposure rate within the therapy room is so high that an individual who is accidentally in the treatment room when the machine is turned "ON" may receive as much as 1250 mR exposure during the time required to reach an access door, special cut-off, or panic buttons shall be required. When pressed, these buttons, operable by open hand at appropriate positions about the treatment room, shall cause the irradiation to be terminated.
(7) Effective means shall be provided to prevent access to the treatment room during exposure. For equipment capable of operating above 150 kVp, each access door to the treatment room shall be provided with a fail-safe interlock. The interlock system shall be so designed that the failure of any 1 component cannot jeopardize the safety of the system, such as the use of series connected double switch assemblies at access doors, and dual interlock relays. If an access door is opened when the machine is "ON", the interlock shall cause termination or reduction of exposure as specified in R 333.5312(14).
(8) Red warning signal lights, energized only when the useful beam in "ON", shall be located on the control panel and near each entrance to the therapy room. Under conditions as specified in

subrule (6) of this rule a visible signal shall also be located within the therapy room. Depending upon control panel and door locations, a single warning signal light may be sufficient to comply with this subrule.

R 333.5317 Conditions of operation.
Rule 317. (1) An installation shall be operated in compliance with all limitations determined necessary and specified in writing by the department.
(2) The output of the x-ray generator shall be calibrated before use for the treatment of patients for each technique or condition of use. The department shall be informed by telephone or in writing of completion of initial calibration before patient treatment is initiated. A written report of this initial calibration shall be submitted within 30 days to the department. Recalibration shall be required after each tube replacement and after any changes or replacement in the generating apparatus which could affect a change in the x-ray output. Check calibrations shall be made on an annual basis and records of all calibration maintained for not less than 7 years.
(3) X-ray therapy equipment capable of operating above 150 kVp shall not be operated routinely until the radiation safety of the installation has been established by a protection survey conducted pursuant to R 333.5063. The department shall be informed by telephone or in writing of completion of the initial survey before patient treatment is initiated. A written report of this initial survey shall be submitted within 30 days to the department. All x-ray therapy equipment shall be operated in conformance with recommendations of the protection survey.
(4) Both the control panel and the patient shall be observable during exposure.
(5) When a patient must be held in position for radiation therapy, mechanical supporting or restraining devices should be used. If the patient must be held by an individual, upon approval by the radiologist in charge followed by written notice to the department, that individual shall be provided protection equivalent to 7 half-value layers and shall be positioned so that no part of his or her body can be struck by the useful beam and is as far as possible from the edge of the useful beam. The exposure of an individual used for this purpose shall be monitored and a permanent record maintained. The individual selected for this purpose shall not otherwise be occupationally exposed to ionizing radiation.
(6) With the exception of subrule (5) of this rule, an individual other than the patient shall not be permitted in the treatment room when the tube is operated at potentials exceeding 85 kVp. At potentials of 85 kVp or below, other individuals may be permitted in the treatment room by the radiologist in charge if they are essential to conduct the treatment, but only if they are protected as specified in subrule (5) of this rule and their radiation exposure is monitored and permanently recorded.
(7) Personnel monitoring shall be performed in controlled areas for each individual occupationally exposed to ionizing radiation from therapeutic x-ray equipment. Individual monitoring devices, such as film badge dosimeters or thermoluminescent dosimeters, shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(8) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(9) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. Monitoring of other body parts shall comply with R 333.5065.
(10) Monitoring devices worn to estimate personnel occupational exposure shall not be worn by the individual when he or she is exposed as a patient for a medical or dental reason.
(11) Lead, lead rubber, lead foil, and similar materials used for limiting the field shall not transmit more than 5% of the useful beam under the conditions at which the machine is operated

for therapy. This subrule does not apply to treatment blocks used to adjust or modify the intended radiation dose to the area of treatment.
(12) A therapeutic x-ray system shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

THERAPEUTIC MACHINES OPERATED AT OR BELOW 85 KVP

R 333.5321 X-ray equipment.
Rule 321. (1) The x-ray equipment shall comply with the requirements of R 333.5312, excluding subrules (11), (14), and (16).
(2) Maximum potential shall be mechanically or electronically limited to 85 kVp.
(3) A contact therapy machine shall meet the additional requirement that the leakage radiation at 5 centimeters (2 inches) from the surface of the tube housing shall not exceed 0.1 R/h. As used in this subrule, "contact therapy machine" means an x-ray therapy machine designed for source to skin treatment distances of 5 centimeters or less at tube potentials in the range of 20 to 50 kVp.

R 333.5322 Enclosures.
Rule 322. An enclosure shall comply with the requirements of R 333.5315(1) and (2).

R 333.5323 Conditions of operation.
Rule 323. (1) Operation shall comply with the requirements of R 333.5317.
(2) If the x-ray tube of a contact therapy machine as defined in R 333.5321(3) is hand held during irradiation, the operator shall wear protective gloves and a protective apron. When practical, a cap of at least 0.5 millimeter lead equivalence should cover the aperture window of the tube housing of the apparatus when not being used. Because the exposure rate at the surface of the window of contact therapy and beryllium window machines may be more than 10,000 roentgens per minute, extreme precautions shall be taken to prevent accidental exposure to the useful beam.

FIXED RADIOGRAPHIC INSTALLATIONS

R 333.5325 X-ray equipment.
Rule 325. (1) All x-ray tube housings in fixed radiographic installations shall be of the diagnostic type.
(2) The aluminum equivalent of the total filtration in the useful beam shall not be less than the values shown in table 325-1.

TABLE 325-1

Operating Potential	Minimum Total Filter (Inherent plus added)
Below 50 kVp	0.5 mm aluminum
50-70 kVp	1.5 mm aluminum
Above 70 kVp	2.5 mm aluminum

(3) If the filter in the machine is not accessible for examination and the total filtration is not known, subrule (2) of this rule may be assumed to have been met if the half-value layer is not less than any of the following:
(a) 0.6 mm aluminum at 49 kVp.
(b) 1.6 mm aluminum at 70 kVp.
(c) 2.6 mm aluminum at 90 kVp.
(4) Under conditions of subrule (3) of this rule for tube potentials above 90 kVp, subrule (2) of this rule may be assumed to have been met if the half-value layer is not less than that specified in table 325-2.
(5) The half-value layer of the useful beam for a given x-ray tube potential shall not be less than the values shown in table 325-2.

TABLE 325-2

Design Operating Range (kVp)	Measured Potential (kVp)	Half-value Layer (mm aluminum)
Below 50	30	0.3
	40	0.4
	49	0.5
50 to 70	50	1.2
	60	1.3
	70	1.5
Above 70	80	2.3
	90	2.5
	100	2.7
	110	3.0
	120	3.2
	130	3.5
	140	3.8
	150	4.1

(6) To determine the half-value layer at an x-ray tube potential which is not listed in table 325-2, linear interpolation or extrapolation may be made. Positive means shall be provided to ensure that at least the minimum filtration needed to achieve these beam quality requirements is in the useful beam during each exposure.
(7) Machines equipped with beryllium window x-ray tubes with removable filters shall contain keyed filter interlock switches in the tube housing and suitable indication on the control panel of the added filter in the useful beam. The total filtration permanently in the useful beam shall not be less than 0.5 millimeter aluminum equivalent and shall be clearly indicated on the tube housing.

(8) Beryllium window x-ray tubes shall not be used routinely for general purpose diagnostic examinations. Such a tube may comprise an x-ray subsystem if needed for special soft tissue technique in accord with subrule (7) of this rule.
(9) Beam-limiting devices, such as diaphragms, cones, or adjustable collimators, capable of restricting the useful beam to the area radiographically recorded shall be provided to define the beam and shall provide the same degree of attenuation as that required of the tube housing.
(10) Beam-limiting devices shall be calibrated in terms of the size of the projected useful beam at specified source-image receptor distances (SID). This calibration shall be clearly and permanently recorded on the beam-limiting device. Calibration of adjustable beam-limiting devices shall permit reproducible settings.
(11) X-ray systems designed for only 1 image receptor size at a fixed SID shall be provided with means to limit the field at the plane of the image receptor to dimensions no greater than those of the image receptor, and to align the center of the x-ray field with the center of the image receptor to within 2% of the SID.
(12) General purpose radiographic x-ray systems shall be equipped with adjustable beam-limiting devices containing light localizers that define the entire field.
(13) The size of the x-ray beam projected by fixed aperture beam-limiting devices, except those used for stereoradiography, shall not exceed the dimensions of the image receptor by more than 2% of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
(14) The calibrated field size indicator on adjustable beam-limiting devices shall be accurate to within 2% of the SID. The light field shall be aligned with the x-ray field with the same degree of accuracy. The field size projected by automatic adjustable beam-limiting devices shall provide the same precision.
(15) For radiographic procedures resulting in multiple views on a single image receptor, the beam-limiting device shall limit the x-ray field size to the recorded radiographic image size within 2% of the SID. Covering a portion of the image receptor with radio-opaque material is not a substitute for proper x-ray field limitation.
(16) Radiographic x-ray machines used for purposes other than mammography or extremity radiography only shall be capable of operation at not less than an average current of 100 milliamperes (mA) during all radiographic techniques used. A machine not capable of sustained operation at not less than an average of 100 mA for the duration of a given technique shall not be used for that technique.
(17) A device shall be provided which terminates the exposure at a preset time interval or exposure limit. The operator shall be able to terminate the exposure at any time by discontinuing pressure upon the exposure switch except that during serial radiography means may be provided to permit completion of a single exposure in progress.
(18) The exposure switch, except for those used in conjunction with spot film devices in fluoroscopy, shall be securely fixed so that the operator is required to be behind a fixed shield which intercepts the useful beam and any radiation which has been scattered only once.
(19) When 2 or more x-ray tube heads are operated from a single exposure switch, there shall be indication at the control panel showing which tube is connected and ready to be energized and means to prevent energizing more than 1 tube head simultaneously. Machines designed for simultaneous multiple tube operation shall have positive means for selecting single tube or multiple tube operation.
(20) The control panel shall provide positive visual identification of the production of x-rays when the x-ray tube is energized. A milliammeter may comply with this subrule.
(21) A signal audible to the operator shall indicate that the exposure has ended.

(22) The technique factors to be used during an exposure shall be indicated before the exposure begins. When automatic exposure controls are used, only those technique factors which are set before the exposure shall be indicated. On equipment having fixed technique factors, this requirement may be met by permanent markings. Indication of technique factors shall be visible from the operator's position.

R 333.5331 Enclosures.
Rule 331. (1) An enclosure shall be a permanent part of the building or equipment. Portable shields shall not be used for permanent installations.
(2) The degree of protection required for an enclosure shall be determined by the workload, use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance. The design shall be subject to approval by the department. Recommended shielding is posted on the department's website.
(3) In a radiographic room, wall and floor areas exposed to the useful beam plus an additional area extending at least 30 centimeters (1 foot) beyond shall be provided with a primary protective barrier as determined by workload, use and occupancy factors, and distance. All vertical primary protective barriers specified in this rule shall extend continuously from the floor to a minimum height of 2.1 meters (7 feet).
(4) Secondary protective barriers shall be provided in the radiographic room ceiling and in those walls not requiring primary barriers.
(5) Control apparatus for the radiographic equipment shall be shielded by a primary protective barrier which cannot be removed from a protective position between the operator and the radiation source during machine operation.
(6) Movable barriers with electrical interlocks shall not be approved in place of compliance with subrule (5) of this rule.
(7) Exposure switch location and control shield shall be oriented so that, at arm's length from the exposure switch, the operator is not exposed to the useful beam, leakage radiation, or any radiation scattered only once.
(8) The operator shall be able to see and communicate with the patient from a shielded position at the control panel. When an observation window is provided, it shall have a lead equivalence at least equal to that required of the control barrier and shall be installed so that the attenuation effectiveness of the barrier is not impaired.
(9) At times it may be necessary for personnel to remain within an operating room or special procedure installation during radiographic exposures. A primary protective barrier shall be provided for personnel protection under these circumstances unless necessary technique prevents use of such protection. This barrier may be movable if necessary. Movable barriers shall not be permitted in place of the provisions of subrules (3) and (5) of this rule.

R 333.5333 Conditions of operation.
Rule 333. (1) An operator shall properly utilize the beam-limiting devices provided to restrict the useful beam to the smallest area consistent with clinical requirements. Particular care shall be taken to align accurately the x-ray beam with the patient and film.
(2) The operator shall ensure the presence of adequate filtration before a radiographic procedure.
(3) Staff personnel routinely working with or around radiation sources shall not be required by the registrant to hold film or restrain patients during radiography. If such procedure is permitted, personnel exposure shall not exceed the limits in R 333.5057 to R 333.5059 or the procedure shall be prohibited.

(4) When a patient must be held in position for radiography, mechanical supporting or restraining devices shall be available and shall be used unless contraindicated. If the patient must be held by an individual, this individual shall wear protective gloves and a protective apron of 0.5 millimeter minimum lead equivalence and shall be positioned so that no part of his or her body can be struck by the useful beam and that his or her body is as far as possible from the edge of the useful beam.
(5) Only individuals whose presence is necessary shall be permitted in the radiographic room during an exposure. An individual, except the patient, shall be protected by 0.5 millimeter minimum lead equivalent aprons unless protected by an approved primary barrier.
(6) Personnel monitoring shall be performed in controlled areas for each individual occupationally exposed to ionizing radiation from diagnostic x-ray equipment. Individual monitoring devices such as film badge dosimeters or thermoluminescent dosimeters shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(7) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(8) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. Monitoring of all other body parts shall comply with R 333.5065.
(9) Monitoring devices worn to estimate personnel occupational exposure shall not be worn by the individual when he or she is exposed as a patient for a medical or dental reason.
(10) The gonads of children and individuals who have not passed the reproductive age shall be protected from the useful beam either by the use of shielding (0.5 mm lead equivalent), collimation, or special gonad shields when this does not interfere with the conditions or objectives of the examination.
(11) Intensifying screens shall be employed to reduce patient exposure except in cases where a noticeable decrease in image definition may reduce the clinical value of the examination. Film and screen speed combinations shall be carefully selected to produce the necessary clinical information with the least exposure to the patient consistent with current clinical judgment.
(12) Film processing materials and techniques shall be those recommended by the x-ray film and processing materials manufacturers unless otherwise tested to ensure maximum information content of the developed film. Sight developing is not permitted except under extreme emergency conditions. Correct temperature control and development time shall be used.
(13) A radiographic x-ray system shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

FIXED FLUOROSCOPIC INSTALLATIONS

R 333.5337 X-ray equipment.
Rule 337. (1) All x-ray tube housings of fixed fluoroscopic installations shall be of the diagnostic type.
(2) The beam quality shall comply with the provisions of R 333.5325(5) and R 333.5325(6).
(3) Means shall be provided on all fluoroscopic machines to limit the source-skin distance to not less than 38 centimeters. For image intensified fluoroscopes intended for specific surgical application that would be prohibited at this source-skin distance, provisions may be made for operation at shorter distances but in no case less than 20 centimeters.
(4) Provision shall be made to intercept the scattered x-rays from the undersurface of the table top and other structures under the fluoroscopic table if the tube is mounted under the table. A cone or shield shall provide the same degree of attenuation as is required of the tube housing.

(5) A shielding device of at least 0.25 millimeter lead equivalence for covering the bucky slot during fluoroscopy shall be provided.
(6) A shielding device of at least 0.25 millimeter lead equivalence, such as overlapping protective drapes or hinged or sliding panels, shall be used to intercept scattered radiation which would otherwise reach the fluoroscopist and others near the machine.
(7) The equipment shall be so constructed that, under conditions of normal use, the entire cross section of the useful beam is attenuated by a primary protective barrier, permanently incorporated into the equipment. The exposure shall automatically terminate when the barrier is removed from the useful beam.
(8) A fluoroscopic machine shall comply with both of the following:
(a) The entire cross section of the useful beam shall be intercepted by the primary protective barrier of the fluoroscopic image assembly at any SID. The fluoroscopic tube shall not produce x-rays unless the barrier is in position to intercept the entire useful beam. The exposure rate due to transmission through the barrier with the attenuation block in the useful beam combined with radiation from the image intensifier, if provided, shall not exceed 2 milliroentgens per hour at 10 centimeters from any accessible surface of the fluoroscopic imaging assembly beyond the plane of the image receptor for each roentgen per minute of entrance exposure rate.
(b) The entrance exposure rate shall be measured pursuant to subrule (16) of this rule. The exposure rate due to transmission through the primary barrier combined with radiation from the image intensifier shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension greater than 20 centimeters. If the source is below the tabletop, the measurement shall be made with the input surface of the fluoroscopic imaging assembly positioned 30 centimeters above the tabletop. If the source is above the tabletop and the SID is variable, the measurement shall be made with the end of the beam-limiting device or spacer as close to the tabletop as it can be placed, if it is not closer than 30 centimeters. Movable grids and compression devices shall be removed from the useful beam during the measurement. For all measurements, the attenuation block shall be positioned in the useful beam 10 centimeters from the point of measurement of the entrance exposure rate and between this point and the input surface of the fluoroscopic imaging assembly.
(9) The lead equivalence of the barrier of conventional fluoroscopes shall be not less than 1.5 millimeters at 100 kVp, 1.8 millimeters at 125 kVp, and 2.0 millimeters at potentials greater than 125 kVp.
(10) A beam-limiting device shall be provided to restrict the size of the useful beam to less than the area of the barrier. The x-ray tube and beam-limiting system shall be linked with the fluorescent screen assembly so that the useful beam at the fluorescent screen is confined within the barrier irrespective of the panel-screen distance. For image intensifiers, the useful beam shall be centered on the input phosphor. It should not exceed the diameter of the input phosphor during fluoroscopy or cine-recording. For spot film radiography with image intensifier equipment, the shutters should automatically open to the required field size before the exposure.
(11) Beam-limiting devices such as collimators, adjustable diaphragms, or shutters, shall provide the same degree of attenuation as is required of the tube housing.
(12) A fluoroscopic machine shall comply with either of the following:
(a) The x-ray field produced by nonimage-intensified fluoroscopic equipment shall not extend beyond the entire visible area of the image receptor. Means shall be provided to permit further limitation of the field. The minimum field size at the greatest SID shall be equal to or less than 5 by 5 centimeters.
(b) For image-intensified fluoroscopic equipment, the total misalignment of the edges of the x-ray field with the respective edges of the visible area of the image receptor along any dimension

of the visually defined field in the plane of the image receptor shall not exceed 3% of the SID. The sum, without regard to sign, of the misalignment along any 2 orthogonal dimensions intersecting at the center of the visible area of the image receptor shall not exceed 4% of the SID. For rectangular x-ray fields used with circular image receptors, the error in alignment shall be determined along the length and width dimensions of the x-ray field which pass through the center of the visible area of the image receptor. Means shall be provided to permit further limitation of the field. The minimum field size, at the greatest SID, shall be equal to or less than 5 by 5 centimeters.
(13) X-ray production in the fluoroscopic mode shall be controlled by a device which requires continuous pressure by the operator for the entire time of an exposure. When recording serial fluoroscopic images, the operator shall be able to terminate the x-ray exposures at any time, but means may be provided to permit completion of any single exposure of the series in progress.
(14) When the fluoroscope is operated at 80 kVp, the exposure rate at the position where the beam enters the patient shall not exceed 3.2 R/mA-min and should not exceed 2.1 R/mA-min.
(15) Entrance exposure rate limits for fluoroscopic equipment shall be as follows:
(a) Machines with automatic exposure rate control shall not be operable at a combination of tube potential and current which results in an a exposure rate in excess of 10 roentgens per minute at the point where the center of the useful beam enters the patient, except during recording of fluoroscopic images or when an optional high level control is provided. Special means of activation of high level controls, such as additional pressure applied continuously by the operator, shall be required to avoid accidental use. A continuous signal audible to the fluoroscopist shall indicate that the high level control is being employed.
(b) Machines without automatic exposure rate control shall not be operable at a combination of tube potential and current which results in an exposure rate in excess of 5 roentgens per minute at the point where the center of the useful beam enters the patient, except during recording of fluoroscopic images or when an optional high level control is activated. Special means of activation of high level controls, such as additional pressure applied continuously by the operator, shall be provided to avoid accidental use. A continuous signal audible to the fluoroscopist shall indicate that the high level control is being employed.
(16) Compliance with subrule (15) of this rule shall be determined as follows:
(a) If the source is below the table, the exposure rate shall be measured 1 centimeter above the tabletop or cradle.
(b) If the source is above the table, the exposure rate shall be measured at 30 centimeters above the tabletop with the end of the beam-limiting device or spacer positioned as closely as possible to the point of measurement.
(c) In a C-arm type of fluoroscope, the exposure rate shall be measured 30 centimeters from the input surface of the fluoroscopic imaging assembly.
(17) Means shall be provided to present the cumulative on-time of the fluoroscopic tube. The maximum cumulative time of the timing device shall not exceed 5 minutes without resetting. A signal audible to the fluoroscopist shall indicate the completion of a preset cumulative on-time. This signal shall continue to sound while x-rays are produced until the timing device is reset.
(18) Devices which indicate the x-ray tube potential and current shall be provided. On image intensified fluoroscopic equipment, these devices should be located in such a manner that the operator may monitor the tube potential and current during fluoroscopy.

R 333.5347 Enclosures.
Rule 347. (1) An enclosure shall be a permanent part of the building or equipment. Portable shields shall not be used for permanent installations.

(2) The degree of protection required for an enclosure shall be determined by the workload, use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance, and shall be subject to design approval by the department. Recommended shielding is posted on the department's website.
(3) For conventional fluoroscopy, extraneous light that interferes with the fluoroscopic examination shall be eliminated. Dark adaptation normally is not necessary when using image intensifiers.

R 333.5348 Conditions of operation.
Rule 348. (1) An individual present in a fluoroscopic room, except the patient, shall wear a protective apron of at least 0.5 millimeter lead equivalence.
(2) Only individuals whose presence is needed to conduct the examination, to conduct radiation protection surveys, or to undergo specific training shall be permitted in the fluoroscopy room during x-ray exposures.
(3) Personnel monitoring shall be performed in controlled areas for each individual occupationally exposed to ionizing radiation from diagnostic x-ray equipment. Individual monitoring devices, such as film badge dosimeters or thermoluminescent dosimeters, shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(4) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(5) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. Monitoring of all other body parts shall comply with R 333.5065.
(6) Monitoring devices worn to estimate personnel occupational exposure shall not be worn by the individual when he or she is exposed as a patient for a medical or dental reason.
(7) The fluoroscopist's eyes should be sufficiently dark-adapted for the visual task required before commencing conventional fluoroscopy. Under no circumstances shall he or she attempt to compensate for inadequate adaptation by increasing exposure factors employed or by prolonging the fluoroscopic examination.
(8) Special precautions, consistent with clinical needs, shall be taken to minimize exposure of the gonads of potentially procreative patients and exposure of the embryo or fetus in patients known to be or suspected of being pregnant. Gonadal shielding is advised when it does not interfere with the conditions or objectives of the examination.
(9) In cineradiography, special care shall be taken to limit patient exposure when tube currents and potentials employed are higher than those normally used in fluoroscopy. The exposure rates to which patients are normally subjected shall be determined annually and records of the surveys maintained.
(10) A fluoroscopic x-ray system shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

MOBILE OR PORTABLE DIAGNOSTIC X-RAY EQUIPMENT

R 333.5351 X-ray equipment.
Rule 351. (1) Radiographic x-ray equipment shall comply with the requirements of R 333.5325 excluding subrules (11) and (18).
(2) Fluoroscopic x-ray equipment shall comply with the requirements of R 333.5337 excluding subrules (3), (4), (5), (6), and (9).

(3) The radiographic exposure control switch shall be located on the machine where adequate personnel protection is provided to attenuate the direct and scatter radiation, or the length of switch cord shall be such that the operator shall be able to stand at least 1.8 meters (6 feet) from the patient, the x-ray tube, and out of the useful beam. A coil type extension switch cord capable of providing more than 1.8 meters (6 feet) of distance protection is recommended.
(4) Hand-held fluoroscopic screens and others not attached to a diagnostic source assembly with stable mounting shall not be used.
(5) Image intensification shall always be provided on mobile fluoroscopic equipment. Mobile fluoroscopic equipment shall be impossible to operate unless the useful beam is intercepted by the image intensifier. Means shall be provided to limit the source-skin distance to not less than 30 centimeters (12 inches). For fluoroscopes intended for specific surgical application that would be prohibited at the source-skin distances specified in this subrule, provisions may be made for operation at shorter source-skin distances but in no case less than 20 centimeters.

R 333.5352 Shielding.
Rule 352. (1) Portable shielding of at least 1.6 millimeter (1/16 inch) lead equivalent shall be used by the operator and other individuals in the room when possible.
(2) Mobile or portable diagnostic x-ray equipment used routinely in 1 location shall be considered a fixed installation and shall comply with the requirements of R 333.5325 and R 333.5331, or R 333.5337 and R 333.5347, or both.

R 333.5353 Conditions of operation.
Rule 353. (1) Operation shall comply with the requirements of R 333.5333 and R 333.5348.
(2) Individuals operating mobile or portable diagnostic x-ray equipment shall wear a protective apron of minimum 0.5 millimeter lead equivalence unless portable shielding is provided as specified in R 333.5352(1).
(3) Mobile or portable diagnostic x-ray equipment shall not be used for routine radiography or fluoroscopy in hospitals or private offices of health practitioners licensed under article 15 of the act. This equipment shall only be used when it is medically inadvisable to move a patient to a fixed radiographic or fixed fluoroscopic installation.

MISCELLANEOUS AND SPECIAL INSTALLATIONS

R 333.5355 General provisions.
Rule 355. (1) Types of x-ray sources and uses not specifically covered by this part and not exempted in R 333.5033, shall comply with R 333.5001 to R 333.5101.
(2) For the purpose of registering and approving medical x-ray producing equipment and devices not specifically covered by this part the protective design, the workload, the use factor, and the occupancy factor shall be considered.

PART 8. MEDICAL EXTREMITY X-RAY INSTALLATIONS

R 333.5361 Purpose and scope.
Rule 361. (1) This part establishes requirements governing the use of x-radiation in a healing arts discipline for human extremity radiography only.
(2) This part applies to all registrants who use x-radiation for the intentional exposure of human extremities only.

(3) In addition to the requirements of this part, all registrants performing human extremity radiography are subject to all applicable provisions of these rules. Uses of x-radiation for intentional human exposure other than or in addition to extremity radiography are subject to R 333.5311 to R 333.5359.

FIXED RADIOGRAPHIC INSTALLATIONS

R 333.5362 X-ray equipment.
Rule 362. (1) All x-ray tube housings in fixed radiographic installations shall be of the diagnostic type.
(2) The aluminum equivalent of the total filtration in the useful beam shall not be less than that shown in table 362.

TABLE 362

Operating Potential	Minimum Total Filter (Inherent plus added)
Below 50 kVp	0.5 mm aluminum
50-70 kVp	1.5 mm aluminum
Above 70 kVp	2.5 mm aluminum

(3) If the filter in the machine is not accessible for examination and the total filtration is not known, subrule (2) of this rule may be assumed to have been met if the half-value layer is not less than any of the following:
(a) 0.6 mm aluminum at 49 kVp.
(b) 1.6 mm aluminum at 70 kVp.
(c) 2.6 mm aluminum at 90 kVp.
(4) Under conditions of subrule (3) of this rule, for tube potentials above 90 kVp, subrule (2) of this rule may be assumed to have been met if the half-value layer is not less than that specified in table 325-2 in R 333.5325(5).
(5) Beam-limiting devices, such as diaphragms, cones, or adjustable collimators, capable of restricting the useful beam to the area radiographically recorded shall be provided to define the beam and shall provide the same degree of attenuation as that required of the tube housing.
(6) Beam-limiting devices shall be calibrated in terms of the size of the projected useful beam at specified source-image receptor distances (SID). The calibration shall be clearly and permanently recorded on the beam-limiting device. Calibration of adjustable beam-limiting devices shall permit reproducible settings.
(7) X-ray systems designed for only 1 image receptor size at a fixed SID shall be provided with means to limit the field at the plane of the image receptor to dimensions no greater than those of the image receptor, and to align the center of the x-ray field with the center of the image receptor to within 2% of the SID.
(8) The size of the x-ray beam projected by fixed aperture beam-limiting devices, except those used for stereoradiography, shall not exceed the dimensions of the image receptor by more than 2% of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
(9) The calibrated field size indicator on adjustable beam-limiting devices shall be accurate to within 2% of the SID. The light field shall be aligned with the x-ray field with the same degree

of accuracy. The field size projected by automatic adjustable collimators shall provide the same precision.
(10) For radiographic procedures resulting in multiple views on a single image receptor, the beam-limiting device shall limit the x-ray field size to the recorded radiographic image size within 2% of the SID. Covering a portion of the image receptor with radio-opaque material is not a substitute for proper x-ray field limitation.
(11) A device shall be provided to terminate the exposure at a preset time interval or exposure limit. The operator shall be able to terminate the exposure at any time by discontinuing pressure upon the exposure switch.
(12) Unless protective shielding is provided for the operator, the length of the exposure control switch cord or remote control location shall be such that the operator shall be able to stand at least 1.8 meters (6 feet) away from the patient and the x-ray tube and out of the useful beam. When protective shielding is provided, the operator shall always be entirely behind the shield during the exposure.
(13) The control panel shall provide positive identification of the production of x-rays when the x-ray tube is energized. A milliammeter may meet the requirements of this subrule.
(14) The technique factors to be used during an exposure shall be indicated before the exposure begins. When automatic exposure controls are used, only those technique factors which are set before the exposure shall be indicated. On equipment having fixed technique factors, this requirement may be met by permanent markings. Indication of technique factors shall be visible from the operator's position.
(15) A signal audible to the operator shall indicate that the exposure has ended.

R 333.5365 Enclosures.
Rule 365. (1) The degree of protection required for an enclosure shall be determined by the workload, use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance, and shall be subject to design approval by the department.
(2) In a radiographic room, wall and floor areas exposed to the useful beam plus an area extending at least 30 centimeters (1 foot) beyond shall be provided with a primary protective barrier where necessary as determined by workload, use and occupancy factors, and distance.
(3) Secondary protective barriers shall be provided in the radiographic room ceiling and in those walls not requiring primary barriers. Common building materials often fulfill this requirement.
(4) A fixed barrier of 1.6 millimeters (1/16 inch) lead equivalence, such as a shielded wall partition or immobilized portable shield, is recommended for operator protection. When this protection is provided, the operator shall be able to see and communicate with the patient from a shielded position.

R 333.5366 Conditions of operation.
Rule 366. (1) An operator shall properly utilize the beam-limiting devices provided to restrict the useful beam to the smallest area consistent with clinical requirements. Particular care shall be taken to align accurately the x-ray beam with the patient and film.
(2) The operator shall ensure the presence of adequate filtration before each radiographic procedure.
(3) Staff personnel routinely working with or around radiation sources shall not be required by the registrant to hold film or restrain patients during radiography. If the procedure is permitted, personnel exposure shall not exceed the limits in R 333.5057 to R 333.5059 or the procedure shall be prohibited.

(4) When a patient is held in position for radiography, mechanical supporting or restraining devices shall be available and shall be used unless contraindicated. If the patient is held by an individual, this individual shall wear protective gloves and a protective apron of 0.5 millimeter minimum lead equivalence and shall be positioned so that no part of his or her body can be struck by the useful beam and that his or her body is as far as possible from the edge of the useful beam.
(5) During each exposure, the operator shall stand at least 1.8 meters (6 feet) from the patient and the x-ray tube and outside the useful beam or behind a suitable barrier.
(6) Only individuals whose presence is necessary shall be permitted in the radiographic room during an exposure. An individual, except the patient, shall be protected by 0.5 millimeter minimum lead equivalent aprons unless protected by an approved primary barrier.
(7) Personnel monitoring shall be performed in controlled areas for each individual occupationally exposed to ionizing radiation from diagnostic x-ray equipment. Individual monitoring devices, such as film badge dosimeters or thermoluminescent dosimeters, shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(8) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(9) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. Monitoring of all body parts shall comply with R 333.5065.
(10) Monitoring devices worn to estimate personnel occupational exposure shall not be worn by the individual when he or she is exposed as a patient for a medical or dental reason.
(11) The gonads of children and individuals who have not passed the reproductive age shall be protected from the useful beam either by the use of shielding (0.5 mm lead equivalent), collimation, or special gonad shields. Special gonadal aprons (0.25 mm lead equivalent) are recommended, but not required, for patient protection from secondary radiation.
(12) Intensifying screens shall be employed to reduce patient exposure except in cases where a noticeable decrease in image definition may reduce the clinical value of the examination. Film and screen speed combinations shall be carefully selected to produce the necessary clinical information with the least exposure to the patient consistent with current clinical judgment.
(13) Film processing materials and techniques shall be those recommended by the x-ray film and processing materials manufacturers unless otherwise tested to insure maximum information content of the developed film. Sight developing is not permitted except under extreme emergency conditions. Correct temperature control and development time shall be used.
(14) A radiographic x-ray system shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

MOBILE OR PORTABLE RADIOGRAPHIC EQUIPMENT

R 333.5368 General provisions.
Rule 368. (1) Radiographic x-ray equipment shall meet the requirements of R 333.5362.
(2) Mobile or portable radiographic x-ray equipment used routinely in 1 location shall be considered a fixed installation and enclosures shall meet the requirements of R 333.5365.
(3) Operation shall comply with the requirements of R 333.5366.

PART 9. DENTAL X-RAY INSTALLATIONS

R 333.5371 Purpose and scope.
Rule 371. (1) This part establishes requirements governing the use of x-radiation in dentistry.
(2) This part applies to all registrants who use x-radiation in dentistry for the intentional exposure of humans.
(3) In addition to the requirements of this part all registrants are subject to all applicable provisions of these rules.

CONVENTIONAL (SINGLE TUBE) INSTALLATIONS

R 333.5372 Scope.
Rule 372. R 333.5373 to R 333.5376 apply to installations consisting of a single x-ray source, its individual control unit, and protective enclosure used for the production of intraoral radiographs.

R 333.5373 X-ray equipment.
Rule 373. (1) The tube housing shall be of the diagnostic type.
(2) The aluminum equivalent of the total filtration in the useful beam shall not be less than that shown in table 373-1.

TABLE 373-1

Operating Potential	Minimum Total Filter (Inherent plus added)
Below 50 kVp	0.5 mm aluminum
50 - 70 kVp	1.5 mm aluminum
Above 70 kVp	2.5 mm aluminum

(3) If the filter in the machine is not accessible for examination and the total filtration is not known, subrule (2) of this rule may be assumed to have been met if the half-value layer is not less than any of the following:
(a) 0.6 mm aluminum at 49 kVp.
(b) 1.6 mm aluminum at 70 kVp.
(c) 2.6 mm aluminum at 90 kVp.
(4) Under conditions of subrule (3) of this rule, for tube potentials above 90 kVp, subrule (2) of this rule may be assumed to have been met if the half-value layer is not less than that specified in table 373-2.
(5) The half-value layer of the useful beam for a given x-ray tube potential shall not be less than the values shown in table 373-2.

TABLE 373-2

Design Operating Range (kVp)	Measured Potential (kVp)	Half-value Layer (mm aluminum)
Below 50	30	0.3
	40	0.4
	49	0.5
50 to 70	50	1.2
	60	1.3
	70	1.5

Above 70	80	2.3
	90	2.5
	100	2.7
	110	3.0
	120	3.2
	130	3.5
	140	3.8
	150	4.1

(6) To determine the half-value layer at an x-ray tube potential which is not listed in table 373-2, linear interpolation or extrapolation may be made. Positive means shall be provided to ensure that at least the minimum filtration needed to achieve these beam quality requirements is in the useful beam during each exposure.
(7) Radiographic equipment designed for use with an intraoral image receptor shall be provided with means to limit the x-ray beam to either of the following:
(a) If the minimum source-skin distance is 18 centimeters or more, the x-ray field at the minimum source-skin shall be containable in a circle having a diameter of not more than 7 centimeters.
(b) If the minimum source-skin is less than 18 centimeters, the x-ray field at the minimum SSD shall be containable in a circle having a diameter of not more than 6 centimeters.
(8) For intraoral exposures, means shall be provided to limit the source-skin distance to not less than 18 centimeters with apparatus operable above 50 kVp, and not less than 10 centimeters with apparatus not operable above 50 kVp. Open-ended cones are recommended to reduce scattered radiation.
(9) Mechanical support of the tube head and pointer cone shall maintain the exposure position without drift or vibration of sufficient magnitude to cause the need for manually restraining the tube or retaking the x-ray.
(10) A device shall be provided that terminates the exposure at a preset time interval or exposure limit. The operator shall be able to terminate the exposure at any time by discontinuing pressure upon the exposure switch except that during serial radiography means may be provided to permit completion of a single exposure of the series in progress.
(11) If a recycling timer is employed, it shall not be possible to make a repeat exposure without release of the exposure switch to reset the timer.
(12) The exposure control switch shall have a circuit-closing contact which can be maintained only by continuous pressure on the switch by the operator.
(13) Unless protective shielding is provided for the operator, the length of the exposure control switch cord or remote control location shall be such that the operator shall be able to stand at least 1.8 meters (6 feet) away from the patient and the x-ray tube and out of the useful beam.
(14) The control panel shall provide positive visual identification of the production of x-rays when the x-ray tube is energized. A milliammeter may meet the requirements of this subrule.
(15) A signal audible to the operator shall indicate that the exposure has ended.
(16) The technique factors to be used during an exposure shall be indicated before the exposure begins, except when automatic exposure controls are used, in which case the technique factors which are set before the exposure shall be indicated. On equipment having fixed technique factors, this requirement may be met by permanent markings. Indication of technique factors shall be visible from the operator's position.

R 333.5375 Shielding.
Rule 375. Conventional building materials in partitions, floors, and ceilings may provide adequate radiation shielding for dental installations. When a conventional building structure does not provide adequate shielding, the shielding shall be increased by providing greater thickness of building materials or by adding lead, concrete, steel, or other suitable materials to the walls, floor, and ceiling of an existing room. Shielding shall be subject to approval by the department.

R 333.5376 Conditions of operation.
Rule 376. (1) Deliberate exposure of an individual to the useful beam for training or demonstration purposes shall not be permitted unless there is a diagnostic need for the exposure and the exposure is prescribed by a dentist or physician.
(2) The operator or the assistant shall not hold the image receptor in place for the patient during the exposure.
(3) During the exposure, the operator shall stand at least 1.8 meters (6 feet) from the patient and the x-ray tube and outside the useful beam or behind a suitable barrier.
(4) Only an individual whose presence is necessary to conduct the radiographic examination shall be permitted in the radiographic room during exposure.
(5) The operator shall direct the x-ray tube such that the useful beam strikes a primary barrier or unoccupied area after emerging from the patient.
(6) Neither the tube housing nor the cone shall be hand-held during the exposure.
(7) Fluoroscopy shall not be used in dental examinations.
(8) The exposure to the patient shall be kept to the practical minimum consistent with clinical objectives.
(9) The x-ray beam and the image receptor shall be aligned very carefully with the area to be radiographed.
(10) Processing materials and techniques shall be those recommended by the x-ray film manufacturer unless otherwise tested to ensure maximum information content of the developed film. Sight developing is not permitted except under extreme emergency conditions. Correct temperature control and development time are necessary to minimize radiation dose to the patient.
(11) A radiographic x-ray system shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

MULTIPLE TUBE INSTALLATIONS

R 333.5378 Scope.
Rule 378. R 333.5379 to R 333.5381 apply to installations consisting of more than 1 x-ray source in the same room, or of sources located in separate rooms. These installations may include 2 or more complete x-ray units (single tube units), or a combination of 2 or more x-ray tube heads operable from a single control panel (multiple tube units).

R 333.5379 X-ray equipment.
Rule 379. (1) X-ray equipment in multiple tube installations shall meet the requirements of R 333.5373 with regard to each tube housing assembly and each complete x-ray unit.
(2) On multiple tube units, there shall be indication at the control panel showing which tube is connected and ready to be energized and means to prevent energizing more than 1 tube head at the same time.

(3) For multiple tube units there shall be indication at the tube housing assembly when it is connected and ready to be energized.

R 333.5380 Shielding.
Rule 380. Conventional building materials in partitions, floors, and ceilings may provide adequate radiation shielding for dental installations. When a conventional building structure does not provide adequate shielding, the shielding shall be increased by providing greater thickness of building materials or by adding lead, concrete, steel, or other suitable materials to the walls, floor, and ceiling of an existing room. In multiple tube installations the possibility of exposure from multiple sources shall be considered. Shielding shall be subject to approval by the department.

R 333.5381 Conditions of operation.
Rule 381. Operation shall meet the requirements of R 333.5376.

PANORAMIC INSTALLATIONS

R 333.5383 Scope.
Rule 383. R 333.5384 to R 333.5386 apply to panoramic installations and protective enclosures.

R 333.5384 X-ray equipment.
Rule 384. (1) X-ray equipment in panoramic installations shall meet the requirements of R 333.5373 excluding subrules (7) to (11).
(2) For purposes of this rule, "image receptor" means that portion of the x-ray film or digital receptor instantaneously exposed by the x-ray beam subtended by a beam-limiting diaphragm immediately adjacent to the front of the radiographic film or digital receptor, if the panoramic technique requires this diaphragm.
(3) The x-ray tube housing shall be provided with a beam-limiting diaphragm which shall limit the field at the plane of the image receptor to dimensions not exceeding the dimensions of the image receptor and shall align the center of the x-ray field with the center of the image receptor to within 2% of the SID.
(4) Mechanical support of the tube head and image receptor shall maintain beam alignment without drift or vibration of sufficient magnitude to cause the need for manually restraining the tube or retaking the x-ray.
(5) A device shall be provided which terminates the exposure at a preset time interval or exposure limit. The operator shall be able to terminate the exposure at any time by discontinuing pressure upon the exposure switch.

R 333.5385 Shielding.
Rule 385. Conventional building materials in partitions, floors, and ceilings may provide adequate radiation shielding for panoramic installations. When a conventional building structure does not provide adequate shielding, the shielding shall be increased by providing greater thickness of building materials or by adding lead, concrete, steel, or other suitable materials to the walls, floor, and ceiling of an existing room. Shielding shall be subject to approval by the department.

R 333.5386 Conditions of operation.
Rule 386. Operation shall meet the requirements of R 333.5376.

CEPHALOMETRIC INSTALLATIONS

R 333.5388 Scope.
Rule 388. R 333.5389 to R 333.5391 apply to installations consisting of an x-ray source used for the production of radiographs of the skull or related extra-oral radiographs, its individual control unit, and protective enclosure.

R 333.5389 X-ray equipment.
Rule 389. (1) X-ray equipment in cephalometric installations shall meet the requirements of R 333.5373 excluding subrules (7), (8), (9), and (13).
(2) Beam-limiting devices such as diaphragms, cones, or adjustable collimators, capable of restricting the useful beam to the area radiographically recorded shall be provided to define the beam and shall provide the same degree of attenuation as that required of the tube housing.
(3) Beam-limiting devices shall be calibrated in terms of the size of the projected useful beam at specified source-image receptor distances. This calibration shall be clearly and permanently recorded on the beam-limiting device. Calibration of adjustable beam-limiting devices shall permit reproducible settings.
(4) X-ray systems designed for only 1 image receptor size at a fixed SID shall be provided with means to limit the field at the plane of the image receptor to dimensions not exceeding those of the image receptor, and to align the center of the x-ray field with the center of the image receptor to within 2% of the SID.
(5) The size of the x-ray beam projected by fixed aperture beam-limiting devices, except those used for stereoradiography, shall not exceed the dimensions of the image receptor by more than 2% of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
(6) The calibrated field size indicator on adjustable beam-limiting devices shall be accurate to within 2% of the SID. The light field shall be aligned with the x-ray field with the same degree of accuracy. The field size projected by automatic adjustable beam-limiting devices shall provide the same precision.
(7) For radiographic procedures resulting in multiple views on a single image receptor the beam-limiting device shall limit the x-ray field size to the recorded radiographic image within 2% of the SID. Covering a portion of the image receptor with radio-opaque material is not a substitute for proper x-ray field limitation.

R 333.5390 Shielding.
Rule 390. (1) The degree of protection required shall be determined by the workload, use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance. The design shall be subject to approval by the department.
(2) In a radiographic room, wall and floor areas exposed to the useful beam plus an area extending at least 30 centimeters (1 foot) beyond shall be provided with a primary protective barrier where necessary as determined by workload, use and occupancy factors, and distance. All vertical primary protective barriers specified in this rule shall extend continuously from the floor to a minimum height of 2.1 meters (7 feet).
(3) Secondary protective barriers shall be provided in the radiographic room ceiling and in those walls not requiring primary barriers.

(4) Control apparatus for the radiographic equipment shall be shielded by a non-removable primary protective barrier extending to a minimum height of 2.1 meters (7 feet).
(5) Exposure switch location and control shield shall be oriented such that, at arm's length from the exposure switch, the operator shall not be exposed to the useful beam, leakage radiation, or radiation that has been scattered only once.
(6) The operator shall be able to see and communicate with the patient from a shielded position at the control panel. When an observation window is provided, it shall have a lead equivalence at least equal to that required of the control barrier and shall be installed such that the attenuation effectiveness of the barrier is not impaired.

R 333.5391 Conditions of operation.
Rule 391. Operation shall meet the requirements of R 333.5376 excluding subrule (3).

MULTIPLE PURPOSE INSTALLATIONS

R 333.5395 General provisions.
Rule 395. (1) This rule applies to installations consisting of an x-ray source or sources used for 2 or more purposes described in R 333.5372 to R 333.5391.
(2) X-ray equipment in multiple purpose installations shall meet the applicable requirements of R 333.5373, R 333.5379, R 333.5384, and R 333.5389 for each mode of operation permitted by the design of the equipment.
(3) Shielding in multiple purpose installations shall meet the applicable requirements of R 333.5375, R 333.5380, R 333.5385, and R 333.5390 for each mode of operation permitted by the design of the equipment.
(4) Operation in multiple purpose installations shall meet the applicable requirements of R 333.5376, R 333.5381, R 333.5386, and R 333.5391 for each mode of operation permitted by the design of the equipment.

HAND-HELD PORTABLE DENTAL X-RAY SYSTEMS

R 333.5396 Hand-held portable dental x-ray systems.
Rule 396. (1) X-ray equipment designed to be hand-held shall meet the requirements of R 333.5373, excluding subrules (9) and (13).
(2) The x-ray tube housing for tubes designed to be hand-held shall be constructed so that the leakage radiation measured in air at a distance 5 centimeters from a point on the external surface does not exceed 0.02 mGy (2 milliroentgens) in 1 hour when operated under conditions of maximum radiation output permitted by the design or operating characteristics of the radiation machine.
(3) Operation of a hand-held portable x-ray system shall meet the requirements of R 333.5376, excluding subrules (3) and (6).
(4) Protective shielding of at least 0.5 millimeter lead equivalence shall be provided for the operator to protect the operator’s torso, hands, face, and gonads from backscattered radiation. If the protective shielding is a backscatter shield attached to the unit, the shield shall be positioned as close to the patient as possible and the operator shall take care to remain in a protective position.
(5) An operator shall complete the training program supplied by the manufacturer and approved by the department before using the x-ray unit. Records of the training shall be maintained on file for examination by the department.

(6) Hand-held dental x-ray systems shall not be used for routine dental radiography in dental offices. This equipment shall only be for portable use including use in nursing homes, home health care, or for use on special needs patients.

OTHER TYPES OF INSTALLATIONS

R 333.5397 General provisions.
Rule 397. (1) This rule applies to dental x-ray producing equipment and devices not specifically covered elsewhere by this part.
(2) Types of dental x-ray sources and uses not specifically covered by this part and not exempted under R 333.5033 shall meet the requirements of R 333.5001 to R 333.5101.

PART 10. VETERINARY X-RAY INSTALLATIONS

R 333.5401 Purpose and scope.
Rule 401. (1) This part establishes requirements governing the use of x-radiation in veterinary medicine.
(2) This part applies to all registrants who use x-radiation in veterinary medicine or research for the intentional exposure of animals.
(3) In addition to the requirements of this part, all registrants are subject to R 333.5001 to R 333.5101 and all applicable provisions of the other parts.

THERAPEUTIC MACHINES USED FOR VETERINARY X-RAY TREATMENT

R 333.5402 X-ray equipment.
Rule 402. The x-ray equipment shall meet the requirements of R 333.5312 and R 333.5321.

R 333.5403 Enclosures.
Rule 403. The enclosure shall meet the requirements of R 333.5315 and R 333.5322.

R 333.5404 Conditions of operation.
Rule 404. (1) Operation shall meet the requirements of R 333.5317 excluding subrules (2), (5), (6), and (11).
(2) The output of the x-ray generator should be calibrated initially before use for the treatment of animals. It should also be recalibrated after each tube replacement and after all changes or replacement in the generating apparatus which could affect a change in the x-ray output. Check calibrations should be made on an annual basis and records of all calibration maintained for not less than 5 years.
(3) Patients shall not be hand-held in position for radiation therapy. Mechanical supporting or restraining devices shall be used if restraint is required.
(4) An individual shall not be permitted in the treatment room when the tube is operated at any potential.
(5) The x-ray tube of a contact therapy machine as defined in R 333.5321(3) shall not be hand-held during irradiation. When practical, a cap of at least 0.5 millimeter lead equivalence should cover the aperture window of the tube housing of the apparatus when the apparatus is not being used. Because the exposure rate at the surface of the window of contact therapy and beryllium window machines may be more than 10,000 roentgens per minute, extreme precautions are necessary to prevent accidental exposure to the useful beam.

(6) Lead, lead rubber, lead foil, and similar materials used for limiting the field, should not transmit more than 5% of the useful beam under the conditions at which the machine is operated for therapy.

FIXED RADIOGRAPHIC INSTALLATIONS

R 333.5405 X-ray equipment.
Rule 405. (1) All x-ray tube housings in fixed radiographic installations shall be of the diagnostic type.
(2) The aluminum equivalent of the total filtration in the useful beam shall not be less than the values shown in table 405.

TABLE 405

Operating Potential	Minimum Total Filter (Inherent plus added)
Below 50 kVp	0.5 mm aluminum
50 - 70 kVp	1.5 mm aluminum
Above 70 kVp	2.5 mm aluminum

(3) Beam-limiting devices, such as diaphragms, cones, or adjustable collimators, capable of restricting the useful beam to the area radiographically recorded shall be provided to define the beam and shall provide the same degree of attenuation as that required of the tube housing.
(4) Beam-limiting devices shall be calibrated in terms of the size of the projected useful beam at specified source-image receptor distances (SID). This calibration shall be clearly and permanently recorded on the beam-limiting device. Calibration of adjustable beam-limiting devices shall permit reproducible settings.
(5) X-ray systems designed for only 1 image receptor size at a fixed SID shall be provided with means to limit the field at the plane of the image receptor to dimensions not greater than those of the image receptor, and to align the center of the x-ray field with the center of the image receptor to within 2% of the SID.
(6) General purpose radiographic x-ray systems should be equipped with adjustable beam-limiting devices containing light localizers that define the entire field.
(7) The size of the x-ray beam projected by fixed aperture beam-limiting devices, except those used for stereoradiography, shall not exceed the dimensions of the image receptor by more than 2% of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
(8) The calibrated field size indicator on adjustable beam-limiting devices shall be accurate to within 2% of the SID. The light field shall be aligned with the x-ray field with the same degree of accuracy. The field size projected by automatic adjustable beam-limiting devices shall provide the same precision.
(9) For radiographic procedures resulting in multiple views on a single image receptor the beam-limiting device shall limit the x-ray field size to the recorded radiographic image size within 2% of the SID. Covering a portion of the image receptor with radio-opaque material is not a substitute for proper x-ray field limitation.
(10) A device shall be provided which terminates the exposure at a preset time interval or exposure limit. The operator shall be able to terminate the exposure at all times by discontinuing

pressure upon the exposure switch except that during serial radiography means may be provided to permit completion of a single exposure of the series in progress.
(11) A primary radiographic exposure switch shall be provided which shall be securely fixed so that the operator shall be behind a fixed shield which intercepts the useful beam and radiation which has been scattered only once.
(12) An auxiliary foot switch may be provided to activate the radiographic tube in addition to, but not in substitution of, the requirement of subrule (11) of this rule. This auxiliary switch need not be fastened behind a fixed shield.
(13) The control panel shall provide positive visual identification of the production of x-rays when the x-ray tube is energized. A milliammeter may meet the requirement of this subrule.
(14) A signal audible to the operator shall indicate that the exposure has ended.
(15) The technique factors to be used during an exposure shall be indicated before the exposure begins. When automatic exposure controls are used, only those technique factors which are set before the exposure shall be indicated. On equipment having fixed technique factors, this requirement may be met by permanent markings. Indication of technique factors shall be visible from the operator's position.

R 333.5407 Enclosures.
Rule 407 (1) An enclosure shall be a permanent part of the building or equipment. Portable shields shall not be used for permanent installations.
(2) The degree of protection required for an enclosure shall be determined by the workload, use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance. The design shall be subject to approval by the department.
(3) In a radiographic room, wall and floor areas exposed to the useful beam plus an additional area extending at least 30 centimeters (1 foot) beyond shall be provided with a primary protective barrier as determined by workload, use and occupancy factors, and distance. All vertical primary protective barriers specified in this rule shall extend continuously from the floor to a minimum height of 2.1 meters (7 feet).
(4) Secondary protective barriers shall be provided in the radiographic room ceiling and in those walls not requiring primary barriers.
(5) Control apparatus for the radiographic equipment shall be shielded by a primary protective barrier which cannot be removed from a protective position between the operator and the radiation source during machine operation.
(6) Movable barriers with electrical interlocks shall not be approved in place of compliance with subrule (5) of this rule.
(7) The primary exposure switch location and control shield shall be oriented so that, at arm's length from the exposure switch, the operator shall not be exposed to the useful beam, leakage radiation, or radiation which has been scattered only once.
(8) The operator shall be able to see and communicate with personnel within the room from a shielded position at the control panel. When an observation window is provided, it shall have a lead equivalence at least equal to that required of the control barrier and shall be installed so that the attenuation effectiveness of the barrier is not impaired.
(9) At times it may be necessary for personnel to remain within operating room or special procedure installations during radiographic exposures. A primary protective barrier shall be provided for personnel protection under these circumstances unless necessary technique prevents its use. This barrier may be movable if necessary. Movable barriers shall not be permitted in place of the provisions of subrules (3) and (5) of this rule.

R 333.5409 Conditions of operation.
Rule 409. (1) An operator shall properly utilize the beam-limiting devices provided to restrict the useful beam to the smallest area consistent with clinical requirements. Particular care shall be taken to align accurately the x-ray beam with the patient and film.
(2) The operator shall ensure the presence of adequate filtration before a radiographic procedure pursuant to R 333.5405(2).
(3) When a patient or film is held in position for radiography, mechanical supporting or restraining devices shall be available and shall be used unless contraindicated. Proper use of these devices shall permit the operator to stand behind the primary control shield during most radiographic procedures.
(4) If the patient or film is held by 1 or more individuals, each individual shall wear protective gloves and body aprons of 0.5 millimeter minimum lead equivalence. Each individual shall be so positioned that no part of his or her body is struck by the useful beam and that his or her body is as far as possible from the edge of the useful beam.
(5) Only individuals whose presence is necessary shall be permitted in the radiographic room during an exposure. These individuals shall be protected as specified in subrule (4) of this rule unless protected by an approved primary barrier.
(6) If an auxiliary foot switch is provided as specified in R 333.5405(12), it shall be used only by a licensed veterinarian and only at times when sufficient personnel are not available to permit use of the primary exposure switch specified in R 333.5405(11).
(7) To protect the feet of the veterinarian or his or her assistant from the primary beam while restraining patients, the underside of the radiographic table shall be protected by at least 1.6 millimeter (1/16 inch) lead or equivalent protection approved by the department.
(8) Personnel monitoring shall be performed in controlled areas for each individual occupationally exposed to ionizing radiation from diagnostic x-ray equipment. Individual monitoring devices, such as film badge dosimeters or thermoluminescent dosimeters, shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(9) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(10) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. Monitoring of all other body parts shall comply with R 333.5065.
(11) Monitoring devices worn to estimate personnel occupational exposure shall not be worn by the individual when he or she is exposed as a patient for a medical or dental reason.
(12) Medical x-ray screen type films and intensifying screens shall be employed to reduce patient exposure except in cases where a noticeable decrease in image definition resulting from increased sensitivity may reduce the clinical value of the examination.
(13) Film processing materials and techniques shall be those recommended by the x-ray film and processing materials manufacturers unless otherwise tested to ensure maximum information content of the developed film. Sight developing is not permitted except under extreme emergency conditions. Correct temperature control and development time are necessary to minimize radiation dose to the patient.
(14) A radiographic x-ray system shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

FIXED FLUOROSCOPIC INSTALLATIONS

R 333.5411 X-ray equipment.

Rule 411. (1) All x-ray tube housings in fixed fluoroscopic installations shall be of the diagnostic type.
(2) The aluminum equivalent of the total filtration permanently in the useful beam shall not be less than 2.5 millimeters aluminum.
(3) The source-patient distance on fluoroscopic machines should not be less than 45 centimeters (18 inches) and shall not be less than 30 centimeters (12 inches).
(4) Provision shall be made to intercept the scattered x-rays from the undersurface of the table top and other structures under the fluoroscopic table if the tube is mounted under the table. A cone or shield shall provide the same degree of attenuation as is required of the tube housing.
(5) A shielding device of at least 0.25 millimeter lead equivalence for covering the bucky slot during fluoroscopy shall be provided.
(6) A shielding device of at least 0.25 millimeter lead equivalence, such as overlapping protective drapes or hinged or sliding panels, shall be used to intercept scattered radiation that would otherwise reach the fluoroscopist and others near the machine.
(7) A fluoroscopic machine shall comply with both of the following:
(a) The entire cross section of the useful beam shall be intercepted by the primary protective barrier of the fluoroscopic image assembly at any SID. The fluoroscopic tube shall not produce x-rays unless the barrier is in position to intercept the entire useful beam. The exposure rate due to transmission through the barrier with the attenuation block in the useful beam combined with radiation from the image intensifier, if provided, shall not exceed 2 milliroentgens per hour at 10 centimeters from an accessible surface of the fluoroscopic imaging assembly beyond the plane of the image receptor for each roentgen per minute of entrance exposure rate.
(b) The entrance exposure rate shall be measured as described in subrule (14) of this rule. The exposure rate due to transmission through the primary barrier combined with radiation from the image intensifier shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension greater than 20 centimeters. If the source is below the tabletop, the measurement shall be made with the input surface of the fluoroscopic imaging assembly positioned 30 centimeters above the tabletop. If the source is above the tabletop and the SID is variable, the measurement shall be made with the end of the beam-limiting device or spacer as close to the tabletop as it can be placed, if it is not closer than 30 centimeters. Movable grids and compression devices shall be removed from the useful beam during the measurement. For all measurements, the attenuation block shall be positioned in the useful beam 10 centimeters from the point of measurement of the entrance exposure rate and between this point and the input surface of the fluoroscopic imaging assembly.
(8) The lead equivalence of the barrier of conventional fluoroscopes shall be not less than 1.5 millimeters at 100 kVp, 1.8 millimeters at 125 kVp, and 2.0 millimeters at potentials greater than 125 kVp.
(9) A beam-limiting device shall be provided to restrict the size of the useful beam to less than the area of the barrier. The x-ray tube and beam-limiting system shall be linked with the fluorescent screen assembly so that the useful beam at the fluorescent screen is confined within the barrier irrespective of the panel-screen distance. For image intensifiers, the useful beam shall be centered on the input phosphor. It should not exceed the diameter of the input phosphor during fluoroscopy or cine-recording. For spot film radiography with image intensifier equipment, the shutters should automatically open to the required field size before the exposure.
(10) Beam-limiting devices, such as collimators, adjustable diaphragms, or shutters, shall provide the same degree of attenuation as is required of the tube housing.
(11) A fluoroscopic machine shall comply with either of the following:

(a) The x-ray field produced by nonimage-intensified fluoroscopic equipment shall not extend beyond the entire visible area of the image receptor. Means shall be provided to permit further limitation of the field. The minimum field size at the greatest SID shall be equal to or less than 5 by 5 centimeters.
(b) For image-intensified fluoroscopic equipment, the total misalignment of the edges of the x-ray field with the respective edges of the visible area of the image receptor along any dimension of the visually defined field in the plane of the image receptor shall not exceed 3% of the SID. The sum, without regard to sign, of the misalignment along any 2 orthogonal dimensions intersecting at the center of the visible area of the image receptor shall not exceed 4% of the SID. For rectangular x-ray fields used with circular image receptors, the error in alignment shall be determined along the length and width dimensions of the x-ray field which pass through the center of the visible area of the image receptor. Means shall be provided to permit further limitation of the field. The minimum field size, at the greatest SID, shall be equal to or less than 5 by 5 centimeters.
(12) X-ray production in the fluoroscopic mode shall be controlled by a device that requires continuous pressure by the operator for the entire time of an exposure. When recording serial fluoroscopic images, the operator shall be able to terminate the x-ray exposures at any time, but means may be provided to permit completion of any single exposure of the series in progress.
(13) When the fluoroscope is operated at 80 kVp, the exposure rate at the position where the beam enters the patient shall not exceed 3.2 R/mA-min and should not exceed 2.1 R/mA-min.
(14) Entrance exposure rate limits for fluoroscopic machines shall be as follows:
(a) Machines with automatic exposure rate control shall not be operable at a combination of tube potential and current which results in an exposure rate in excess of 10 roentgens per minute at the point where the center of the useful beam enters the patient, except during recording of fluoroscopic images or when an optional high level control is provided. Special means of activation of high level controls, such as additional pressure applied continuously by the operator, shall be required to avoid accidental use. A continuous signal audible to the fluoroscopist shall indicate that the high level control is being employed.
(b) Machines without automatic exposure rate control shall not be operable at a combination of tube potential and current which results in an exposure rate in excess of 5 roentgens per minute at the point where the center of the useful beam enters the patient, except during recording of fluoroscopic images or when an optional high level control is activated. Special means of activation of high level controls, such as additional pressure applied continuously by the operator, shall be provided to avoid accidental use. A continuous signal audible to the fluoroscopist shall indicate that the high level control is being employed.
(15) Compliance with subrule (13) of this rule shall be determined as follows:
(a) If the source is below the table, the exposure rate shall be measured 1 centimeter above the tabletop or cradle.
(b) If the source is above the table, the exposure rate shall be measured at 30 centimeters above the tabletop with the end of the beam-limiting device or spacer positioned as closely as possible to the point of measurement.
(c) In a C-arm type of fluoroscope, the exposure rate shall be measured 30 centimeters from the input surface of the fluoroscopic imaging assembly.
(16) Means shall be provided to preset the cumulative on-time of the fluoroscopic tube. The maximum cumulative time of the timing device shall not exceed 5 minutes without resetting. A signal audible to the fluoroscopist shall indicate the completion of the preset cumulative on-time. This signal shall continue to sound while x-rays are produced until the timing device is reset.

(17) Devices which indicate the x-ray tube potential and current shall be provided. On image intensified fluoroscopic equipment, these devices should be located in such a manner that the operator may monitor the tube potential and current during fluoroscopy.

R 333.5417 Enclosures.
Rule 417. (1) An enclosure shall be a permanent part of the building or equipment. Portable shields shall not be used for permanent installations.
(2) The degree of protection required for an enclosure shall be determined by the workload, the use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance. The design shall be subject to approval by the department.
(3) For conventional fluoroscopy extraneous light that interferes with the fluoroscopic examination shall be eliminated. Dark adaptation normally is not necessary when using image intensifiers.

R 333.5418 Conditions of operation.
Rule 418. (1) An individual present in a fluoroscopic room shall wear a protective apron of at least 0.5 millimeter lead equivalence.
(2) Only individuals whose presence is needed to conduct the examination, to conduct radiation protection surveys, or to undergo specific training shall be permitted in the fluoroscopy room during x-ray exposures.
(3) Personnel monitoring shall be performed in controlled areas for each individual occupationally exposed to ionizing radiation from diagnostic x-ray equipment. Individual monitoring devices, such as film badge dosimeters or thermoluminescent dosimeters, shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(4) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(5) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. Monitoring of all other body parts shall meet the requirements of R 333.5065.
(6) Monitoring devices worn to estimate personnel occupational exposure shall not be worn by the individual when he or she is exposed as a patient for a medical or dental reason.
(7) The fluoroscopist's eyes should be sufficiently dark-adapted for the visual task required before commencing conventional fluoroscopy. Under no circumstances shall he or she attempt to compensate for inadequate adaptation by increasing exposure factors employed or by prolonging the fluoroscopic examination.
(8) A fluoroscopic x-ray system shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

MOBILE OR PORTABLE DIAGNOSTIC X-RAY EQUIPMENT

R 333.5421 X-ray equipment.
Rule 421. (1) Radiographic x-ray equipment shall meet the requirements of R 333.5405 excluding subrules (5) and (11).
(2) Fluoroscopic x-ray equipment shall meet the requirements of R 333.5411 excluding subrules (3), (4), (5), and (7).
(3) The radiographic exposure control switch shall be located on the machine where adequate personnel protection is provided to attenuate the direct and scatter radiation, or the length of switch cord shall be such that the operator shall be able to stand at least 1.8 meters (6 feet) from

the patient, the x-ray tube, and out of the useful beam. A coil type extension switch cord capable of providing more than 1.8 meters (6 feet) of distance protection is recommended.
(4) Hand-held fluoroscopic screens and others not attached to a diagnostic source assembly with stable mounting shall not be used.
(5) Image intensification shall always be provided on mobile fluoroscopic equipment. Mobile fluoroscopic equipment shall be impossible to operate unless the useful beam is intercepted by the image intensifier. Means shall be provided to limit the source-skin distance to not less than 30 centimeters (12 inches). For fluoroscopes intended for specific surgical application that would be prohibited at the source-skin distances specified in this subrule, provisions may be made for operation at shorter source-skin distances but in no case less than 20 centimeters.

R 333.5422 Shielding.
Rule 422. (1) Portable shielding of at least 1.6 millimeter (1/16 inch) lead equivalent shall be used by the operator and other individuals nearby when possible.
(2) Mobile or portable diagnostic x-ray equipment used routinely in 1 location shall be considered a fixed installation and shall meet the requirements of R 333.5405 and R 333.5407, or R 333.5411 and R 333.5417, or both.

R 333.5423 Conditions of operation.
Rule 423. (1) Operation shall meet the requirements of R 333.5409 and R 333.5418.
(2) Individuals operating mobile or portable diagnostic x-ray equipment shall wear a protective apron of minimum 0.5 millimeter lead equivalence unless portable shielding is provided as specified in of R 333.5422(1).

MISCELLANEOUS AND SPECIAL INSTALLATIONS

R 333.5425 General provisions.
Rule 425. (1) Types of x-ray sources and uses not specifically covered by this part and not exempted in R 333.5033, shall meet the requirements in R 333.5001 to R 333.5101.
(2) For the purpose of registering and approving veterinary x-ray producing equipment and devices not specifically covered by this part the protective design, the workload, the use factor, and the occupancy factor shall be considered.

PART 11. PARTICLE ACCELERATOR INSTALLATIONS

R 333.5431 Purpose and scope.
Rule 431. (1) This part establishes procedures for the registration of particle accelerators, a classification system for particle accelerator installations and use, and radiation safety requirements for persons utilizing all types of particle accelerators except those specifically exempted from this part.
(2) This part applies to all registrants who use particle accelerators for a purpose other than those exempted under R 333.5432.
(3) In addition to the requirements of this part, all registrants are subject to the applicable provisions of these rules.

R 333.5432 Definition.
Rule 432. "Particle accelerator" or "accelerator", as used in this part, means a radiation machine designed for or capable of accelerating electrically charged particles, such as electrons, protons

or deuterons, with an electrical potential in excess of 1 MeV. Radiation machines designed and used exclusively for the production of electron beams or x-radiation for any of the following purposes except those capable of producing radioactive material in excess of exempt quantities listed in schedule B of R 325.5147 are excluded from this definition:
(a) The diagnosis or treatment of patients.
(b) Industrial radiography.
(c) Examination of the microscopic structure of materials.
(d) Manufacturing process control.
(e) Research and development.
(f) Demonstration of scientific principles for educational purposes.

LICENSE OR REGISTRATION

R 333.5435 General provisions.
Rule 435. A person having a particle accelerator subject to this part shall comply with the registration requirements of R 333.5031 to R 333.5049.

CLASSIFICATION

R 333.5437 Class enumeration.
Rule 437. (1) For registration and approval purposes, particle accelerator installations shall be classified as class AA, class A, class B, or class C.
(2) For the purpose of registering and approving mobile or portable particle accelerators intended for limited use at temporary job site locations, this use shall be classified as class D operation.

R 333.5438 Class AA installations.
Rule 438. (1) In class AA installations the accelerator and objects exposed thereto shall be contained within a permanent enclosure.
(2) The enclosure shall be constructed so that the dose equivalent rate as measured in air at a distance of 5 centimeters from an accessible point on the external surface shall not exceed 2 millirems per hour under conditions of maximum radiation output permitted by the design or operating characteristics of the accelerator.
(3) Mechanical or electrical limiters shall limit movement or alignment of the accelerated beam within the enclosure if necessary to comply with subrule (2) of this rule.
(4) A personnel barrier posted pursuant to R 333.5067 to R 333.5072 restricting access to the roof of the enclosure shall meet the requirement of subrule (2) of this rule.
(5) Reliable interlocks shall be provided which prevent an individual from opening the enclosure while the accelerator is in operation or which terminate machine operation if an individual opens the enclosure. These interlocks shall meet the requirements of R 333.5448.
(6) Enclosures of sufficient size to permit human occupancy shall be provided with visible or audible signals or both within the enclosure which are activated a minimum of 5 seconds before accelerator operation. Individuals shall at all times be able to escape from within the enclosure.
(7) An individual shall not be permitted to remain within the enclosure while the accelerator is in operation except as a human patient undergoing radiation treatment.
(8) Protective enclosures and equipment shall be kept in good repair.
(9) Electron beam welders shall meet class AA requirements.
(10) Class AA approval permits unlimited use at maximum capacity.

R 333.5439 Class A installations.
Rule 439. (1) Class A installations shall comply with all requirements of R 333.5438 except for a permissible dose equivalent rate of 7 millirems per hour at an accessible external point.
(2) An individual monitoring device, such as a film badge dosimeter or thermoluminescent dosimeter, shall be permanently assigned to each occupationally exposed individual. This monitoring shall be continuous during employment as a radiation worker.
(3) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(4) Class A approval permits unlimited use at maximum capacity.

R 333.5440 Class B installations.
Rule 440. (1) Class B installations shall comply with all requirements of R 333.5439.
(2) Accelerator beam current and potential controls shall be mechanically or electrically limited so as not to exceed the normal operating conditions as specified in the application for specific license or registration.
(3) Class B approval permits unlimited use under normal operating conditions as specified by subrule (2) of this rule.

R 333.5441 Class C installations.
Rule 441. (1) Class C installations shall comply with all requirements of R 333.5439 except for a permissible dose equivalent rate of 50 millirems per hour at an accessible external point.
(2) The maximum weekly accelerator beam on time shall be established by the department under the conditions specified in the application for specific license or registration.
(3) Warning signs shall be posted in those areas outside the enclosure in which the radiation exposure dose equivalent rate in air at an accessible external point exceeds 2 millirems per hour under conditions of maximum radiation output permitted by the design or limited operating characteristics of the accelerator.
(4) A daily usage log shall be maintained to record machine operation. The record shall be available at the accelerator site for examination by the department.

R 333.5442 Class D operations.
Rule 442. (1) Particle accelerator operations conducted under conditions not meeting the provisions and requirements of R 333.5438 to R 333.5441 shall be classified as class D operations and shall not be operated longer than 30 days unless written authorization is granted by the department.
(2) Written authorization in the form of a registration condition may be granted by the department for class D operations longer than 30 days but not longer than 6 months at 1 location when an undue and unnecessary hardship may result from the 30-day limitation. Written request by the applicant for this authorization is required and shall describe the hardship involved as well as provide written assurance of compliance with the requirements of these rules for class D operation. This assurance shall be in the form of satisfactory written procedures which shall be approved by the department before the issuance of a certificate of registration.

SAFETY REQUIREMENTS FOR THE USE OF PARTICLE ACCELERATORS

R 333.5445 General provisions.

Rule 445. (1) R 333.5445 to R 333.5452 establish radiation safety requirements for the use of particle accelerators. These requirements are in addition to, and not in substitution for, other applicable provisions of these rules.
(2) A registrant shall be responsible for assuring that all requirements of this part are met.

R 333.5446 Limitations.
Rule 446. (1) A registrant shall not permit an individual to act as an accelerator operator until the individual has met all of the following:
(a) Been instructed and demonstrated an understanding of radiation safety.
(b) Received copies of, instruction in, and demonstrated an understanding of R 333.5431 to R 333.5452 and the applicable requirements of all of the following:
(i) R 333.5051 to R 333.5089.
(ii) Pertinent registration conditions.
(iii) The registrant's operating and emergency procedures.
(c) Demonstrated competence to use the particle accelerator, related equipment, and survey instruments employed in his or her assignment.
(2) The radiation safety committee or the radiation protection supervisor shall have the authority to terminate the operations at an accelerator facility or of a class D operation if this action is necessary to protect and minimize danger to public health and safety or property.

R 333.5447 Shielding.
Rule 447. (1) The design and shielding specifications for an accelerator shall be submitted to and approved by the department before issuance of a certificate of registration. After construction, the radiation safety of the installation shall be established by a protection survey conducted pursuant to R 333.5063. A written report of the initial survey shall be submitted to the department and approved in writing before continued operation of the accelerator.
(2) An accelerator installation shall be provided with primary or secondary barriers as are necessary to ensure compliance with R 333.5057 to R 333.5061.

R 333.5448 Accelerator controls and interlock systems.
Rule 448. (1) Instrumentation, readouts, and controls on the accelerator control console shall be clearly identified and easily discernible.
(2) All entrances or openings into a target room or other high radiation area shall be provided with interlocks.
(3) When an interlock system has been tripped, operation of the accelerator shall only be resumed by first manually resetting controls at the position where the interlock has been tripped, and lastly at the main control console.
(4) A safety interlock shall be on a circuit which will allow it to operate independently of all other safety interlocks.
(5) A safety interlock shall be fail safe. A defect or component failure in the interlock system shall prevent operation of the accelerator.
(6) A scram button or other emergency power cutoff switch shall be located and easily identifiable in all high radiation areas. This cutoff switch shall include a manual reset so that the accelerator cannot be restarted from the accelerator control console without resetting the cutoff switch.

R 333.5449 Warning devices.

Rule 449. (1) Locations designated as high radiation areas, and entrances to these locations, shall be equipped with easily observable warning lights that operate when, and only when, radiation is being produced.
(2) Except in installations designed for human exposure, a high radiation area shall have an audible warning device which shall be activated for 15 seconds before the possible creation of a high radiation area. This warning device shall be clearly discernible in all high radiation areas and all radiation areas.
(3) Barriers and pathways leading to high radiation areas shall be identified pursuant to R 333.5067 to R 333.5074.

R 333.5450 Equipment control and operations.
Rule 450. (1) A particle accelerator shall not be left unattended without locking the control panel in a manner which prevents its use by unauthorized individuals.
(2) A mobile or portable particle accelerator shall not be left unattended without locking the room or building in which it is housed in a manner which prevents its removal by unauthorized persons.
(3) Access to keys used to comply with the requirements of subrules (1) and (2) of this rule shall be limited to specific individuals authorized by the radiation protection supervisor.
(4) Only a switch on the accelerator control console shall be routinely used to turn the accelerator beam on and off. The safety interlock system shall not be used to turn off the accelerator beam except in an emergency or during periodic testing of the interlock system.
(5) All safety and warning devices, including interlocks, shall be checked for proper operability at least quarterly. Results of these tests shall be maintained for inspection by the department at the accelerator installation.
(6) Electrical circuit diagrams of the accelerator, and the associated interlock systems, shall be kept current and on file at each
accelerator installation.
(7) If it is necessary to intentionally bypass a safety interlock or interlocks, the action shall be in conformance with all of the following:
(a) Authorized by the radiation protection supervisor pursuant to R 333.5075.
(b) Recorded in a permanent log and a notice posted at the accelerator control console.
(c) Terminated as soon as possible.
(8) A copy of the operating and the emergency procedures shall be maintained at the accelerator control panel.

R 333.5452 Radiation surveys.
Rule 452. (1) A registrant shall maintain at each accelerator installation or class D operation appropriate calibrated and operable portable radiation monitoring instruments to make physical radiation surveys as required by this part and R 333.5051 to R 333.5089.
(2) These instruments shall be capable by design, calibration, and operation of measuring the intensity of the various types and energies of radiation produced by the accelerator. These instruments shall be tested for proper operation at the beginning of each day they are to be used and calibrated at least quarterly.
(3) During repair or calibration of a radiation monitoring instrument, a spare calibrated and operable instrument shall be provided or accelerator operations which require the instrument shall be terminated until required instrumentation is available.

(4) A radiation protection survey shall be performed and documented pursuant to R 333.5063 when changes have been made in shielding, operation, equipment, or occupancy of adjacent areas.
(5) Radiation levels in all accessible high radiation areas shall be continuously monitored except in installations designed for human exposure. The monitoring devices shall be independent and capable of providing a remote and local readout with visual or audible alarms, or both, at the control panel and at the monitoring stations.
(6) All area monitors shall be calibrated at established periodic intervals approved by the department.
(7) All area surveys shall be made as specified in the written procedures established by a health physics consultant or the radiation protection supervisor of the accelerator facility and approved by the department.
(8) Records of all radiation protection surveys, calibration results, instrumentation tests, and smear results shall be kept current and on file at each accelerator facility.

PART 13. MISCELLANEOUS SOURCES

R 333.5481 Purpose and scope.
Rule 481. (1) This part establishes radiation safety requirements for miscellaneous radiation sources and for persons utilizing sources not exempted under R 333.5015 and not specifically covered elsewhere by these rules.
(2) This part applies to all persons who use sources of radiation not specifically covered by the other parts.
(3) In addition to the requirements of this part all persons and activities covered by this part are subject to the applicable provisions of R 333.5001 to R 333.5101.

ANALYTICAL X-RAY SOURCES

R 333.5482 X-ray equipment.
Rule 482. (1) Tube housing leakage from analytical x-ray sources shall not exceed 0.5 milliroentgen per hour at a 5 centimeter distance from the surface of the tube housing with the beam ports blocked and the tube operating at its leakage technique factors. Also, radiation originating from the high voltage power supplies shall not exceed this limit.
(2) For instruments in which the primary x-ray beam is completely enclosed, the radiation shall be less than 2 milliroentgens per hour at a distance of 25 centimeters from the cabinet surface.
(3) For enclosed equipment, interlocks shall be provided on all access panels which terminate exposure and prevent operation while the panel is removed.
(4) Open beam analytical x-ray equipment shall meet all of the following:
(a) X-ray diffraction cameras shall have the appropriate ports arranged so that the camera collimating system is in place before the x-ray tube can be energized or the shutter can be opened.
(b) An adapter between the x-ray tube and the collimator of the diffractometer camera or other accessory shall provide protection equivalent to that required by subrule (1) of this rule.
(c) Safety interlocks shall not be used as routine cut-off switches during normal operation. They shall be operated as safety devices only, and tested periodically. When the interlock system terminates the x-ray beam, it shall be necessary to reset the "on" switch at the control panel to resume operation.

(d) Tube head ports which are not in use shall be secured in a closed position and interlocked to the x-ray generator or warning system.
(e) The shutter indicator shall be conspicuously displayed to disclose the "open" or "closed" position of the shutter.
(f) The instrument shall display a conspicuous warning label such as "CAUTION RADIATION - THIS EQUIPMENT PRODUCES X-RADIATION WHEN ENERGIZED."
(g) A red warning light shall indicate "X-RAY ON" when the equipment is producing x-rays. Other signal lights or alarms shall operate only to indicate a malfunction which may produce a radiation, electrical, or other hazard.

R 333.5484 Administrative procedures.
Rule 484. A radiation protection supervisor shall be appointed to be responsible for radiation safety. This individual's primary job duty shall not be operating the x-ray equipment. The radiation protection supervisor or designated representative shall do all of the following:
(a) Ensure that operational and maintenance procedures are followed.
(b) Provide instruction in safety practices for all individuals working with the x-ray equipment, and those working in the immediate area or periodically review the safety instruction provided for these individuals.
(c) Maintain a personnel monitoring system, as required by R 333.5487.
(d) Review, approve, and supervise modifications or replacement of parts for the x-ray apparatus.
(e) Conduct surveys and tests as necessary to certify compliance with these rules, including specific registration conditions, and maintain records thereof for examination by the department.

R 333.5485 Operators.
Rule 485. (1) An individual shall not act as the operator of analytical x-ray equipment until he or she has received training in radiation safety and has been approved by the radiation protection supervisor or designated representative. The operator shall also demonstrate competence in the use of the machine and radiation survey instruments.
(2) The operator shall be responsible for complying with all procedures associated with the x-ray equipment.

R 333.5486 Operating procedures.
Rule 486. A set of operating procedures, written in understandable and concise language, shall be posted on or adjacent to the machine,.

R 333.5487 Personnel monitoring.
Rule 487. An operator of analytical x-ray equipment having an open-beam configuration shall be provided with finger or wrist radiation monitoring devices. An analytical x-ray system having an open-beam configuration is one in which an individual could accidentally place some part of his or her body in the primary beam path during normal operation. An individual coming in contact with equipment capable of exposing a major portion of the body shall be required to wear whole-body monitoring equipment at all times. Personnel coming in contact with this equipment shall be warned of the nature and type of physiological effects that may be expected when overexposed to radiation.

COLD-CATHODE GAS DISCHARGE TUBES

R 333.5491 Rules applicable.
Rule 491. Cold-cathode gas discharge tubes designed to demonstrate the effects of a flow of electrons or the production of x-radiation are subject to the requirements of R 333.5492 to R 333.5495.

R 333.5492 Exposure rate limit.
Rule 492. (1) Radiation exposure rates produced by cold-cathode gas discharge tubes shall not exceed 10 mR/hr at a distance of 30 centimeters from a point on the external surface of the tube, as measured pursuant to R 333.5493.
(2) The divergence of the exit beam from tubes designed primarily to demonstrate the effects of x-radiation, with the beam blocking device in the open position, shall not exceed π (Pi) steradians.

R 333.5493 Measurements.
Rule 493. (1) Compliance with the exposure rate limit specified in R 333.5492 (1) shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension exceeding 20 centimeters.
(2) Measurements of exposure rates from tubes in enclosures from which the tubes cannot be removed without destroying the function of the tube may be made at a distance of 30 centimeters from a point on the external surface of the enclosure under either of the following conditions:
(a) In the case of enclosures containing tubes designed primarily to demonstrate the production of x-radiation, measurements shall be made with a beam blocking device in the beam blocking position.
(b) In the case of enclosures containing tubes designed primarily to demonstrate the effects of a flow of electrons, measurements shall be made with all movable or removable parts of the enclosure in the position which would maximize external exposure levels.

R 333.5494 Test conditions.
Rule 494. (1) Measurements shall be made under the conditions of use specified in instructions provided by the manufacturer.
(2) Measurements shall be made with the tube operated under forward and reverse polarity.

R 333.5495 Instructions; labels and warnings.
Rule 495. (1) For each tube to which R 333.5492 to R 333.5495 are applicable, the registrant shall ensure the availability of appropriate safety instructions and instructions for the use of the tube. These instructions shall include the specification of a power source for use with the tube.
(2) An enclosure or tube shall have tags or labels inscribed on or permanently affixed , which identify the intended polarity of the terminals and shall include either of the following:
(a) In the case of tubes designed primarily to demonstrate the heat effect, fluorescence effect, or magnetic effect, a warning that application of power in excess of that specified may result in the production of x-rays in excess of allowable limits.
(b) In the case of tubes designed primarily to demonstrate the production of x-radiation, a warning that this device produces x-rays when energized.
(3) The tag or label required by subrule (2) of this rule shall be located on the tube or enclosure so as to be readily visible and legible when the product is fully assembled for use.

ELECTRON MICROSCOPES

R 333.5505 Equipment.
Rule 505. (1) During all phases of operation of an electron microscope at the maximum rated continuous tube current for the maximum rated peak tube potential the radiation exposure rate as measured in air at a distance of 5 centimeters from an accessible point on the external surface of the microscope shall not exceed 0.5 milliroentgen per hour.
(2) Interlocks shall be provided on all potential radiation hazard access panels which terminate exposure and prevent operation while the panel is removed.
(3) The instrument shall display a conspicuous warning label such as "CAUTION RADIATION - THIS EQUIPMENT PRODUCES X-RADIATION WHEN ENERGIZED."
(4) Electron microscopes that are not capable of exceeding an operating potential of 50 kilovolts are exempt from the requirements of R 333.5505 to R 333.5508.

R 333.5506 Administrative procedures.
Rule 506. A radiation protection supervisor shall be appointed to be responsible for radiation safety. This individual shall not normally operate the electron microscope. The radiation protection supervisor or a designated representative shall do all of the following:
(a) Ensure that operational and maintenance procedures are followed.
(b) Provide instruction in safety practices for all persons working with the electron microscope, and those working in the immediate area.
(c) Maintain a personnel monitoring system, if provided.
(d) Review, approve, and supervise modifications or replacement of parts for the electron microscope.
(e) Conduct surveys and tests as necessary to certify compliance with these rules, including specific registration conditions.
(f) Maintain records of surveys and tests for examination by the department.

R 333.5507 Operators.
Rule 507. (1) An individual shall not act as operator of an electron microscope unless he or she has demonstrated to the satisfaction of the radiation protection supervisor or designated representative both of the following:
(a) Competence in the safe use of the instrument.
(b) Awareness of the potential radiation hazard which could result from improper adjustment or misuse of the instrument.
(2) The operator shall be responsible for complying with all procedures associated with the instrument.

R 333.5508 Operating procedures.
Rule 508. A set of operating procedures, written in understandable and concise language shall be posted on or adjacent to the electron microscope.

OTHER MISCELLANEOUS SOURCES

R 333.5511 Registration conditions.
Rule 511. Types of radiation sources and uses not specifically covered by these rules shall be subject to specific requirements designated by the department in the form of registration conditions for the protection of public health, safety, and property until these rules are amended to specifically cover these sources and uses.

PART 14. MAMMOGRAPHY

GENERAL PROVISIONS

R 333.5601 Purpose and scope.

Rule 601. (1) This part establishes requirements governing the use of x-radiation for mammography and applies to all persons who use x-radiation for mammography for the intentional exposure of humans. A person shall not use a radiation machine to perform mammography unless the radiation machine is registered with the department pursuant to R 333.5031 to R 333.5049 and is authorized pursuant to the act to perform mammography.

(2) In addition to the requirements of this part, all persons are subject to all applicable provisions of these rules.

(3) A facility shall not misrepresent to its employees, to the public, or to the department its status with respect to accreditation of the mammography equipment by the American college of radiology, department authorization to perform mammography, or compliance with department rules.

R 333.5602 Adoption by reference.

Rule 602. Some of these rules refer to all or parts of the following nationally recognized standards, which are adopted by reference and identified by date:

(a) Standards of the United States department of health & human services, title 21 - food and drugs, part 900 - mammography. These standards are available for no cost from either of the following sources:

(i) The website of the Michigan department of licensing and regulatory affairs, radiation safety section at http://www.michigan.gov/rss.

(ii) The website of the United States department of health & human services, mammography quality standards act and program at http://www.fda.gov/Radiation-EmittingProducts/MammographyQualityStandardsActandProgram/default.htm.

(b) The regulations in 21 C.F.R. 1020.30, "Diagnostic x-ray systems and their major components" (April 2007), and 21 C.F.R. 1020.31, "Radiographic equipment" (June 2005). These regulations are available for no cost from either of the following sources:

(i) The website of the Michigan department of licensing and regulatory affairs, radiation safety section at http://www.michigan.gov/rss.

(ii) The website of the United States department of health & human services, U.S. food and drug administration at http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm.

(c) Criteria of the American college of radiology, "Mammography Accreditation Program Requirements" (January 2014), and "Stereotactic Breast Biopsy Accreditation Program Requirements" (July 2013). These criteria are available for no cost from either of the following sources:

(i) The website of the Michigan department of licensing and regulatory affairs, radiation safety section at http://www.michigan.gov/rss.

(ii) The website of the American college of radiology at http://www.acr.org.

R 333.5603 Definitions.

Rule 603. (1) As used in this part the definitions in 21 C.F.R. 900.2, "Definitions" (2002), are adopted by reference with the exception of the definition of "mammography."

(2) As used in this part the following definitions apply:

(a) "Interpreting physician" means a physician who interprets mammograms and who meets the requirements of R 333.5627 to R 333.5629.

(b) "Mammography" means radiography of the breast for the purpose of enabling a physician to determine the presence, size, location, and extent of cancerous or potentially cancerous tissue in the breast. Mammography includes interventional mammography.
(c) “Stereotactic breast biopsy” means the imaging of a breast performed in at least 2 planes to localize a target lesion during invasive interventions for biopsy procedures.
(d) “Stereotactic breast biopsy physician” means a physician who conducts stereotactic breast biopsy.

R 333.5604 Department inspections.
Rule 604. (1) The department shall inspect a mammography machine and system not later than 60 days after initial mammography authorization is issued. After that initial inspection, the department shall annually inspect the mammography machine and system. The department may inspect more frequently than annually.
(2) After a satisfactory inspection by the department, the department shall issue a certificate of radiation machine inspection which identifies the facility and the machine inspected and which provides a record of the date that the machine was inspected. The facility shall conspicuously post the certificate on or near the inspected machine and in a location that is observable by patients.
(3) The department may issue a notice of violations certificate if violations found during an inspection are not corrected within the specified time limit or if the department has not received written verification of corrections within the specified time limit. The notice of violations certificate shall be conspicuously posted on or near the inspected machine and in a location observable by patients.
(4) A facility shall remove the certificate of radiation machine inspection if directed by the department due to subsequent failure to comply with these rules as determined by follow-up inspections by the department.
(5) In conducting inspections, the department shall have access to all equipment, materials, records, personnel, and information that the department considers necessary to determine compliance with these rules. The department may copy, or require the facility to submit to the department, any of the materials, records, or information considered necessary to determine compliance with these rules.
(6) The department shall designate department employees to conduct regulatory inspections.
(7) The department may conduct tests and evaluations as the department considers appropriate to determine compliance with all of the provisions of these rules.

MAMMOGRAPHY AUTHORIZATION

R 333.5605 Standards for authorization.
Rule 605. The department shall issue a 3-year mammography authorization if the mammography facility is in compliance with all of the following standards:
(a) The radiation machine meets any of the following requirements:
(i) The machine and the facility in which the machine is used meet the criteria for the American college of radiology mammography accreditation program dated January 2014, and the facility submits an evaluation report issued by the American college of radiology as evidence that the criteria are met. The criteria are adopted by reference in these rules for the purpose of applying this paragraph only.
(ii) A machine used for stereotactic breast biopsy and the facility in which the machine is used meet the criteria of the American college of radiology stereotactic breast biopsy accreditation

program dated July 2013, and the facility submits an evaluation report issued by the American college of radiology as evidence that the criteria are met. The criteria are adopted by reference in these rules for the purpose of applying this paragraph only. A mammography machine that uses a specially designed add-on device for breast biopsy shall be authorized for both mammography and stereotactic breast biopsy.
(iii) The machine is used in a facility that has successfully completed the department's evaluation of the items described in R 333.5610.
(b) The radiation machine, the film or other image receptor used with the machine, and the facility where the machine is used meet the requirements of this part and applicable provisions of these rules.
(c) The radiation machine is specifically designed to perform mammography.
(d) The radiation machine is used exclusively to perform mammography.
(e) The radiation machine is used in a facility that, before the machine is used on patients and at least annually thereafter, has a qualified medical physicist provide on-site consultation to the facility as described in these rules.
(f) The radiation machine is used according to R 333.5667 or R 333.5690 for stereotactic breast biopsy.
(g) The radiation machine is operated only by an individual who can demonstrate to the department that he or she meets the standards described in this part.

R 333.5606 Temporary mammography authorization.
Rule 606. (1) The department may issue a nonrenewable temporary mammography authorization. A temporary authorization may only be issued if additional time is needed to allow the submission of evidence that is satisfactory to the department to demonstrate compliance with the provisions of R 333.5605.
(2) The department may withdraw a temporary authorization before its expiration if the radiation machine does not meet 1 or more of the criteria specified in R 333.5605.

R 333.5607 Application.
Rule 607. (1) An applicant who seeks mammography authorization shall apply to the department using an application form that is supplied by the department. If mammography is performed at more than 1 address, a separate application shall be used for each address. An applicant shall accurately provide all information that is requested on the form. The information submitted as part of the application shall be sufficient, as determined by the department, to address all of the standards for authorization. Applications that do not provide sufficient information shall be returned to the applicant for completion and resubmission. Applications shall include all of the following information:
(a) Information about the facility, including all of the following:
(i) Mammography facility name, address, and telephone number.
(ii) Type of practice.
(iii) The facility registration number, if currently registered.
(iv) A contact person’s name and telephone number.
(b) Personnel information, including the education, training, experience, and certification of the lead interpreting physician, any qualified medical physicist who provides on-site consultation, and any radiologic technologist who performs mammography.
(c) Mammography machine technical information, including all of the following:
(i) Machine registration number, if currently registered.
(ii) Manufacturer.

(iii) Model.
(iv) Target material.
(v) Filter material.
(d) Imaging system information, including all of the following:
(i) The type of imaging system being used.
(ii) Review workstation monitor information, if the machine uses digital imaging.
(iii) Laser printer information, as applicable, for machines using digital imaging.
(iv) Film and screen information, if the machine uses screen-film imaging.
(v) Film processor information, if the machine uses screen-film imaging.
(e) The date of the most recent medical physicist survey.
(2) The department shall respond to an application within 30 days after the date of receipt of the application.

R 333.5608 Application fee schedule; waiver.
Rule 608. (1) An application form for mammography authorization shall be accompanied by a nonrefundable payment, in full, by the applicant, for department evaluation of compliance with the provisions of R 333.5605(a). The fee schedule is on the website of the department.
(2) If an applicant for mammography authorization submits an evaluation report which is issued by the American college of radiology and which demonstrates compliance with the provisions of R 333.5605(a), then the fee for department evaluation of compliance with the provisions of R 333.5605(a) shall be waived.

R 333.5609 Application expiration.
Rule 609. An application for mammography authorization submitted to the department shall expire 6 months from the date of the department's receipt of the completed application unless the time limit is extended by the department.

R 333.5610 Supplemental machine information; effect of failure to submit information.
Rule 610. (1) Upon notice from the department that an application for mammography authorization is complete and complies with these rules and at the specific request of the department, the applicant shall, within 45 days of the department's request, provide all of the following information for each radiation machine for which mammography authorization is being sought:
(a) Confirmation that a department-approved mammography phantom is on-site when mammography is performed and is used in the facility's ongoing quality control program.
(b) Processor or laser film printer quality control data and corrective actions, if any, taken as a result of that data for a 30-day period beginning after the date the application was sent to the department.
(c) An x-ray image of a department-approved mammography phantom which is taken during the 30-day period for which processor quality control data is required under subdivision (b) of this subrule. The phantom image shall be taken using routine machine settings being used by the facility for that mammography machine for a 4.2-centimeter compressed breast of average density. The phantom image shall be accompanied by documentation of the date that the image was taken and the machine settings that were used.
(d) Determinations of the half-value layer, radiation exposure at skin entrance, and mean glandular dose. These determinations shall be made with the use of a department-approved dosimetry device exposed on the phantom during the same exposure that is used to produce an x-

ray image to be submitted under subdivision (c) of this subrule, or that are made by other methods as specified or approved by the department.
(e) A set of clinical images produced on or after the date that the application was sent to the department. Mammography images shall be without pathology for each of 2 representative patients, 1 with dense breasts and 1 with fatty breasts. Stereotactic breast biopsy images shall be from 1 calcification biopsy case that demonstrates accurate needle location and includes the case's corresponding mammograms. The submitted images shall meet all of the following:
(i) The cases are examples of the facility's best work.
(ii) The images are from actual patients.
(iii) Both screen-film and digital images are labeled with the identification information required in R 333.5657 for mammography images or R 333.5683 for stereotactic breast biopsy images.
(iv) The lead interpreting physician reviews and approves the clinical images.
(f) A copy of the medical physicist's most recent equipment survey report.
(2) The department may waive the requirements of subrule (1) of this rule if the mammography machine is accredited, or is in the process of becoming accredited, by the American college of radiology. To have the requirements of subrule (1) of this rule waived, an applicant shall provide, to the department, within 45 days of the department's request, copies of the applicant's current accreditation application, current accreditation-related correspondence to and from the American college of radiology, or current accreditation certificate that is issued by the American college of radiology.
(3) Failure of an applicant to submit the information required by the provisions of either subrule (1) or (2) of this rule within 45 days of the department's request may be considered a basis for withdrawal or denial of the mammography authorization, unless the time limit is extended by the department for cause.

R 333.5611 Contracts for technical evaluation.
Rule 611. (1) In evaluating clinical image quality and acceptability for mammography authorization, upon receipt of the information required in R 333.5610(1)(e), the department may enter into any necessary contracts with mammography experts, submit the images to those experts for technical evaluation, and rely upon their expert evaluation in arriving at a department conclusion regarding image quality and acceptability in terms of granting or not granting mammography authorization.
(2) Technical parameters that are used in evaluating clinical image quality and acceptability pursuant to subrule (1) of this rule shall include judgments of all of the following:
(a) Positioning.
(b) Compression.
(c) Radiation exposure and dose level.
(d) Sharpness.
(e) Contrast.
(f) Noise.
(g) Exam identification.
(h) Artifacts.

R 333.5612 Notice of change in application information; authorization not transferable.
Rule 612. (1) A facility that is authorized to perform mammography shall notify the department, in writing, of any change in the information contained in the application or supporting material upon which authorization was granted or any change that affects the accuracy of information

which is provided or obtained during the application and evaluation process for authorization. Changes that shall be reported include changes in any of the following:
(a) Facility ownership.
(b) Facility location.
(c) Mammography machine.
(d) Image modality.
(e) American college of radiology accreditation status.
(2) Upon receipt of a notice of change, the department shall advise the facility if reapplication for mammography authorization, resubmittal of phantom or clinical images, or other actions are considered by the department to be necessary to establish that the facility, machine, system, and personnel remain in compliance with the requirements of these rules. Upon department request, a facility shall provide any requested information or materials within 45 days after the request is made.
(3) If changes in information are considered to require reapplication for mammography authorization, the application shall be filed and processed in the same manner as set forth in R 333.5607 and R 333.5608.
(4) Mammography authorization that is issued by the department is not transferable between machines or between persons who own or lease a radiation machine.

R 333.5613 Authorization withdrawal; reinstatement.
Rule 613. (1) Three-year mammography authorization is subject to continued compliance with this part and the provisions of these rules. Authorization may be withdrawn based on evidence of noncompliance with this part and the provisions of these rules pursuant to 1969 PA 306, MCL 24.201 to 24.328.
(2) If the department withdraws the mammography authorization of a machine, the machine shall not be used for mammography. An application for reinstatement of a mammography authorization shall be filed and processed in the same manner as an application for mammography authorization under R 333.5607 and R 333.5608.
(3) The department shall not issue a reinstated mammography authorization until the department receives the reinspection fee, inspects the machine, and determines that the facility meets the standards in R 333.5605.

PERSONNEL

R 333.5626 Scope of personnel requirements.
Rule 626. The requirements of R 333.5627 to R 333.5634 apply to all personnel involved in any aspect of mammography, including but not limited to, the production, processing, and interpretation of mammograms and related quality assurance activities.

R 333.5627 Interpreting physician initial qualifications.
Rule 627. Before beginning to interpret mammograms independently, an interpreting physician shall meet all of the following requirements:
(a) Be licensed as a physician or osteopathic physician under article 15 of the act to practice medicine.
(b) Meet either of the following requirements:
(i) Be certified in radiology or diagnostic radiology by the American board of radiology, the American osteopathic board of radiology, or the royal college of physicians and surgeons of Canada; have been eligible for certification in radiology or diagnostic radiology for not more

than 2 years; or, be certified or determined to be qualified in radiology or diagnostic radiology by another professional organization determined by the department to have procedures and requirements adequate to ensure that physicians certified by the body are competent to interpret radiological procedures, including mammography.
(ii) If the physician has been eligible for certification in radiology or diagnostic radiology for less than 2 years, he or she shall have had at least 3 months of documented formal training in the interpretation of mammograms and in topics related to mammography. The training shall include instruction in radiation physics, including radiation physics specific to mammography, radiation effects, and radiation protection. The mammographic interpretation component of the training shall be under the direct supervision of a physician who meets the requirements of this rule.
(c) Have a minimum of 60 hours of documented medical education in mammography, including instruction in the interpretation of mammograms and education in basic breast anatomy, pathology, physiology, technical aspects of mammography, and quality assurance and quality control in mammography. All 60 of these hours shall be category 1 and at least 15 of the category 1 hours shall have been acquired within the 3 years immediately before the date that the physician qualifies as an interpreting physician. Hours spent in residency specifically devoted to mammography are considered as equivalent to category 1 credits and shall be accepted if documented in writing by the appropriate representative of the training institution. A physician who meets the board certification requirements of subdivision (b)(i) of this rule is deemed to have met this requirement.
(d) Have interpreted or multi-read at least 240 mammographic examinations within the 6-month period immediately before the date that the physician qualified as an interpreting physician. The interpretation or multi-reading shall be under the direct supervision of an interpreting physician. A physician who becomes appropriately board certified at the first allowable time, as defined by an eligible certifying body, shall have interpreted or multi-read at least 240 mammographic examinations under the direct supervision of an interpreting physician in any 6-month period during the last 2 years of a diagnostic radiology residency. A physician who was qualified to interpret mammograms before the effective date of this rule is considered to have met the requirements of this subdivision.

R 333.5628 Interpreting physician continuing experience and education.
Rule 628. An interpreting physician shall maintain his or her qualifications by meeting the continuing experience and education requirements of 21 C.F.R. 900.12(a)(1)(ii), "Personnel – Interpreting physicians – Continuing experience and education" (2000).

R 333.5629 Interpreting physician reestablishment of qualifications.
Rule 629. An interpreting physician who failed to maintain the required continuing experience or continuing education requirements of R 333.5628 shall reestablish his or her qualifications before resuming the independent interpretation of mammograms by meeting the reestablishing qualifications requirements of 21 C.F.R. 900.12(a)(1)(iv), "Personnel – Interpreting physicians – Reestablishing qualifications" (2000).

R 333.5630 Radiologic technologists.
Rule 630. All mammographic examinations shall be performed by a radiologic technologist who meets the general requirements, mammography requirements, continuing education requirements, and continuing experience requirements of 21 C.F.R. 900.12(a)(2), "Radiologic technologists" (2000), with the exception of 21 C.F.R. 900.12(a)(2)(i)(A).

R 333.5634 Medical physicists.
Rule 634. A medical physicist who conducts surveys of mammography facilities and provides oversight of a facility's quality assurance program shall meet the initial qualifications, continuing qualifications, and reestablishing qualification requirements of 21 C.F.R. 900.12(a)(3), "Medical physicists" (2000).

R 333.5635 Retention of personnel records.
Rule 635. A mammography facility shall maintain records to document the qualifications of all personnel who work at the facility as interpreting physicians, radiologic technologists, or medical physicists. These records shall be made available for review during department inspections. Records of personnel no longer employed by the mammography facility shall be kept on file until the next inspection following the employee's termination has been completed, and the department determines that the facility complies with the personnel requirements.

X-RAY EQUIPMENT

R 333.5637 X-ray equipment; requirements.
Rule 637. (1) The mammographic x-ray equipment shall be maintained in compliance with the applicable regulations in 21 C.F.R. 1020.30, "Diagnostic x-ray systems and their major components" (2007), and 21 C.F.R. 1020.31, "Radiographic equipment" (2005).
(2) The mammography machine, x-ray film, intensifying screens, film processing solutions, film illumination, and film masking devices shall meet the requirements of 21 C.F.R. 900.12(b), "Equipment" (2000).

R 333.5655 Enclosure requirements; use of mobile equipment.
Rule 655. (1) A fixed x-ray equipment enclosure shall meet the requirements of R 333.5331.
(2) For mammography, the operator's barrier shall provide radiation protection that is equivalent to not less than 0.5 millimeter of lead when the maximum tube potential is less than or equal to 35 kilovolts and 0.8 millimeter of lead when the maximum tube potential is greater than 35 kilovolts.
(3) An individual operating a mobile or portable mammography machine shall wear a protective apron of a minimum 0.5 millimeter lead equivalence unless shielding is provided as specified in subrule (2) of this rule.
(4) Mobile or portable mammography equipment used routinely in 1 location shall be considered a fixed installation and shall meet the requirements of R 333.5331.
(5) Mobile or portable mammography equipment shall not be used for routine mammography in hospitals or private offices of practitioners of the healing arts. This equipment shall be used only when it is medically inadvisable to move a patient to a fixed mammographic installation.

R 333.5656 Conditions of operation.
Rule 656. The operation of a mammography x-ray machine shall meet the requirements of R 333.5333.

MEDICAL RECORDS AND MAMMOGRAPHY REPORTS

R 333.5657 Medical records and mammography reports.

Rule 657. A mammography facility shall comply with 21 C.F.R. 900.12(c), "Medical records and mammography reports" (2000), except that the reference to retention of records in 21 C.F.R. 900.12(c)(4)(i) is changed from "not less than 5 years" to "not less than 7 years" pursuant to MCL 333.20175.

QUALITY ASSURANCE

R 333.5658 Quality assurance - general.
Rule 658. A mammography facility shall comply with 21 C.F.R. 900.12(d), "Quality assurance general" (2000).

R 333.5667 Quality assurance – equipment.
Rule 667. A mammography facility shall comply with 21 C.F.R. 900.12(e), "Quality assurance – equipment" (2000).

R 333.5668 Quality assurance - mammography medical outcomes audit; mammographic procedure and techniques for mammography of patients with breast implants; consumer complaint mechanism; clinical image quality.
Rule 668. A mammography facility shall comply with 21 C.F.R. 900.12(f), "Quality assurance – mammography medical outcomes audit" (2000); 21 C.F.R. 900.12(g), "Mammographic procedure and techniques for mammography of patients with breast implants" (2000); 21 C.F.R. 900.12(h), "Consumer complaint mechanism" (2000) and 21 C.F.R. 900.12(i), "Clinical image quality" (2000).

R 333.5669 Alternative requirements for personnel, x-ray equipment, medical records and mammography reports, and quality assurance.
Rule 669. The department may accept alternatives to a quality standard under 21 C.F.R. 900.12 that have been approved by the U.S. food and drug administration under 21 C.F.R. 900.18, "Alternative requirements for § 900.12 quality standards" (2000).

STEREOTACTIC BREAST BIOPSY

PERSONNEL

R 333.5674 Radiologic technologists.
Rule 674. All stereotactic breast biopsy procedures shall be performed by a radiologic technologist who meets all of the following requirements:
(a) Initial qualifications. Before beginning to perform stereotactic breast biopsy procedures independently, a technologist shall do all of the following:
(i) Meet the requirements of R 333.5630.
(ii) Have 3 hours of category A continuing education units in stereotactic breast biopsy.
(iii) Have performed 5 stereotactic breast biopsy procedures under supervision of a stereotactic breast biopsy physician or a qualified stereotactic breast biopsy technologist.
(b) Continuing experience. Following the second anniversary date of the end of the calendar quarter in which the initial qualifications of subdivision (a) of this rule were completed, the stereotactic breast biopsy technologist shall have performed at least 24 stereotactic breast biopsy procedures during the 24 months immediately preceding the date of the facility's annual

inspection or the last day of the calendar quarter preceding the inspection or any date in between the 2. The facility shall choose 1 of these dates to determine the 24-month period.
(c) Continuing education. A technologist shall comply with the requirements of the American registry of radiologic technologists for continuing education for the imaging modality in which he or she performs services. The continuing education shall include credits pertinent to stereotactic breast biopsy.

R 333.5675 Medical physicists.
Rule 675. A stereotactic breast biopsy medical physicist shall meet all of the following requirements:
(a) Initial qualifications. Before independently performing surveys of stereotactic breast biopsy facilities a medical physicist shall have complied with all of the following:
(i) Met the requirements of R 333.5634.
(ii) Have performed 1 hands-on stereotactic breast biopsy physics survey under a qualified stereotactic breast biopsy medical physicist or 3 independent stereotactic breast biopsy surveys before April 17, 2013.
(b) Continuing experience. Following the second anniversary date of the end of the calendar quarter in which the initial qualifications of subdivision (a) of this rule were completed, the stereotactic breast biopsy medical physicist shall have performed at least 2 stereotactic breast biopsy physics surveys during the 24 months immediately preceding the date of the facility's annual inspection or the last day of the calendar quarter preceding the inspection or any date in between the 2. The facility shall choose 1 of these dates to determine the 24-month period.
(c) Continuing education. Following the third anniversary date of the end of the calendar quarter in which the initial qualifications of subdivision (a) of this rule were completed, the stereotactic breast biopsy medical physicist shall have completed at least 3 continuing medical education credits in stereotactic breast biopsy during the 36 months immediately preceding the date of the facility's annual inspection or the last day of the calendar quarter preceding the inspection or any date in between the 2. The facility shall choose 1 of these dates to determine the 36-month period.

X-RAY EQUIPMENT

R 333.5676 Equipment requirements.
Rule 676. (1) The mammographic x-ray equipment shall be maintained in compliance with the applicable regulations in 21 C.F.R. 1020.30, “Diagnostic x-ray systems and their major components” (2007), and 21 C.F.R. 1020.31, “Radiographic equipment” (2005).
(2) A machine that is used for stereotactic breast biopsy shall be 1 of the following:
(a) A radiation machine that is specifically designed to perform stereotactic breast biopsy.
(b) A mammography machine with a specially designed add-on device for breast biopsy.
(c) A mammography machine that exclusively uses lateral arm devices if the needle can be seen in 2 ways in relation to the target lesion.

R 333.5677 Enclosures; use of mobile equipment.
Rule 677. (1) A fixed x-ray equipment enclosure shall comply with R 333.5331.
(2) For stereotactic breast biopsy, the operator's barrier shall provide radiation protection that is equivalent to not less than 0.5 millimeter of lead when the maximum tube potential is less than or equal to 35 kilovolts and 0.8 millimeter of lead when the maximum tube potential is greater than 35 kilovolts.

(3) An individual operating mobile or portable stereotactic breast biopsy equipment shall wear a protective apron of a minimum 0.5 millimeter lead equivalence unless shielding is provided as specified in subrule (2) of this rule.
(4) Mobile or portable stereotactic breast biopsy equipment used routinely in 1 location shall be considered a fixed installation and shall comply with the requirements of R 333.5331.
(5) Mobile or portable stereotactic breast biopsy equipment shall not be used for routine mammography in hospitals or private offices of physicians or osteopathic physicians. This equipment shall be used only when it is medically inadvisable to move a patient to a fixed mammographic installation.

R 333.5678 Conditions of operation.
Rule 678. The operation of a mammography x-ray machine shall comply with R 333.5333.

MEDICAL RECORDS AND STEREOTACTIC BREAST BIOPSY REPORTS

R 333.5679 Report contents.
Rule 679. A stereotactic breast biopsy facility shall prepare a written report of the results of each stereotactic breast biopsy procedure. The stereotactic breast biopsy report shall include all of the following information:
(a) The name of the patient and an additional unique patient identifier.
(b) The date of the procedure.
(c) The name of the stereotactic breast biopsy physician who conducted the procedure.
(d) The procedure performed.
(e) Designation of the left or right breast.
(f) Description and location of the lesion.

R 333.5681 Communication of stereotactic breast biopsy results to health care providers.
Rule 681. When a patient has a referring health care provider or a patient has named a health care provider, the stereotactic breast biopsy facility shall provide a written report of the stereotactic breast biopsy procedure, including the items listed in R 333.5679, to that health care provider not later than 30 days after the date that the stereotactic breast biopsy procedure was performed.

R 333.5682 Record keeping.
Rule 682. (1) A facility that performs stereotactic breast biopsy procedures shall comply with both of the following:
(a) Maintain stereotactic breast biopsy images and reports in a permanent medical record of the patient for a period of not less than 7 years, or not less than 10 years if no additional stereotactic breast biopsy procedures of the patient are performed at the facility.
(b) Upon request by, or on behalf of, a patient, permanently or temporarily transfer the original stereotactic breast biopsy images and copies of the patient's reports to any of the following:
(i) A medical institution.
(ii) A patient’s physician.
(iii) The patient directly.
(2) Any fee a facility charges a patient for providing the services specified in subrule (1)(b) of this rule shall not exceed the documented costs associated with this service.

R 333.5683 Stereotactic breast biopsy image identification.

Rule 683. A stereotactic breast biopsy image shall have the following information indicated on it in a permanent, legible, and unambiguous manner and placed so as not to obscure anatomic structures:
(a) Name of patient and an additional unique patient identifier.
(b) Date of the procedure.
(c) Designation of left or right breast.
(d) Cassette identification, if applicable.
(e) Stereotactic breast biopsy unit identification if there is more than 1 unit in the facility.

QUALITY ASSURANCE

R 333.5684 Quality assurance – general.
Rule 684. A stereotactic breast biopsy facility shall establish and maintain a quality assurance program to ensure the safety, reliability, clarity, and accuracy of stereotactic breast biopsy services performed at the facility.

R 333.5685 Responsible individuals.
Rule 685. Responsibility for the quality assurance program and for each of its elements shall be assigned to the following individuals who are qualified for their assignments:
(a) Lead stereotactic breast biopsy physician. The facility shall identify a lead stereotactic breast biopsy physician who shall be responsible for ensuring that the quality assurance program meets all requirements of R 333.5684 to R 333.5697. No other individual shall be assigned or shall retain responsibility for quality assurance tasks unless the lead stereotactic breast biopsy physician has determined that the individual is qualified to perform the assignment.
(b) Stereotactic breast biopsy physicians. All stereotactic breast biopsy physicians conducting stereotactic breast biopsy procedures for the facility shall do both of the following:
(i) Follow the facility's procedures for corrective action when the images they are asked to interpret are of poor quality.
(ii) Participate in the facility's medical outcomes audit program.
(c) Medical physicist. The facility shall have the services of a medical physicist available to survey stereotactic breast biopsy equipment and oversee the equipment-related quality assurance practices of the facility. The medical physicist shall be responsible for performing the surveys and stereotactic breast biopsy equipment evaluations and providing the facility with the reports described in R 333.5693 and R 333.5694.
(d) Quality control technologist. Responsibility for tasks within the quality assurance program not assigned to the lead stereotactic breast biopsy physician or the medical physicist shall be assigned to a quality control technologist. The tasks are to be performed by the quality control technologist, but may be delegated to other qualified personnel by the quality control technologist. When other personnel are utilized for these tasks, the quality control technologist shall ensure that they were completed in compliance with R 333.5687.

R 333.5686 Quality assurance records.
Rule 686. (1) The lead stereotactic breast biopsy physician, quality control technologist, and medical physicist shall ensure that records concerning the following items are properly maintained and updated:
(a) Stereotactic breast biopsy techniques and procedures.
(b) Quality control, including monitoring data and corrective actions taken.
(c) Safety.

(d) Employee qualifications to meet assigned quality assurance tasks.
(2) The quality assurance records specified in subrule (1) of this rule shall be kept for each test specified in R 333.5684 to R 333.5697 until the next annual inspection has been completed and the department has determined that the facility is in compliance with the quality assurance requirements, or until the test has been performed 2 additional times at the required frequency, whichever is longer.

R 333.5687 Radiologic technologist quality control tests.
Rule 687. A stereotactic breast biopsy facility shall have a radiologic technologist perform the following quality control tests at the intervals specified in this rule:
(a) A localization accuracy test shall be performed daily before the equipment is used on patients. Each of the indicated needle tip coordinates shall be within 1 millimeter of the actual preset needle tip location.
(b) A phantom image evaluation shall be performed at least weekly. The phantom image shall achieve at least the minimum score established in R 333.5689.
(c) A hard copy output quality test shall be performed at least monthly, if hard copies are produced from digital data.
(d) A compression test shall be performed at least semiannually. The maximum compression force for the power drive mode shall be between 25 pounds and 45 pounds.
(e) A repeat analysis shall be performed at least semiannually. If the overall repeat or reject rate exceeds 20% based on an image volume of not less than 150 patients, the reason for the change shall be determined. A repeat analysis shall be assessed semiannually even if fewer than 150 patients are examined during that period.
(f) If stereotactic breast biopsy is performed using a screen-film system, the following tests shall be required:
(i) A processor quality control test shall be performed at least daily. Film processors used to develop stereotactic breast biopsy films shall be adjusted and maintained to meet the technical development specifications for the mammography film in use. A processor performance test shall be performed at the beginning of each operational day before processing any clinical images. The test shall use the mammography film used clinically at the facility and shall include an assessment of base plus fog density, mid-density, and density difference as follows:
(A) The base plus fog density shall be within 0.03 of the established operating level.
(B) The mid-density shall be within plus or minus 0.15 of the established operating level.
(C) The density difference shall be within plus or minus 0.15 of the established operating level.
(ii) An analysis of fixer retention in film assessed at least quarterly. The residual fixer shall be not more than 5 micrograms per square centimeter.
(iii) A screen-film contact test shall be performed at least semiannually. Testing for screen-film contact shall be conducted using 40 mesh copper screen. All cassettes used in the facility for stereotactic breast biopsy shall be tested.
(iv) A test of darkroom fog shall be performed at least semiannually. The optical density attributable to darkroom fog shall not exceed 0.05 when a mammography film of the type used in the facility, which has a mid-density of not less than 1.2 optical density, is exposed to typical darkroom conditions for 2 minutes while the film is placed on the counter top emulsion side up.

R 333.5688 Annual medical physicist's quality control tests.
Rule 688. Before the radiation machine is used on patients and at least annually thereafter, a stereotactic breast biopsy facility shall have the medical physicist perform all of the following quality control tests:

(a) Collimation assessment that meets either of the following:
(i) For screen-film systems, the x-ray field shall be contained within the image receptor on all 3 sides except the chest wall edge. The x-ray field shall not extend beyond the chest wall edge of the image receptor by more than 2% of the source-image receptor distance.
(ii) For digital image receptors, the x-ray field may extend beyond the edge of the image receptor on all 4 sides, but no edge of the x-ray field shall extend beyond the image receptor by more than 5 millimeters on any side. Distances shall be measured in, or referred to, the plane of the digital image receptor.
(b) Focal spot performance and system limiting spatial resolution. Assess consistency of system-limiting resolution over time and in comparison to acceptance testing results using a line pair test pattern.
(c) Peak tube potential (kVp) accuracy and reproducibility. The tube potential shall be accurate to within 5% of the indicated or selected potential. The coefficient of variation of reproducibility of the potential shall be less than or equal to 0.02 at the most commonly used clinical settings.
(d) Beam quality assessment. The half-value layer shall be greater than or equal to the value kVp/100 in units of millimeter of aluminum.
(e) Automatic exposure control system or manual exposure performance assessment that meets either of the following:
(i) For screen-film systems, the image optical density shall be within 0.15 of the mean optical density when thicknesses of a homogeneous material is varied over a range of 4 to 8 centimeters using the clinical techniques for each thickness. If the optical densities do not meet this criterion, the medical physicist shall develop a technique chart which meets this criterion.
(ii) For digital systems, the signal value at the center of the digital field of view shall remain within 20% of the signal obtained for the 4 centimeter phantom when thicknesses of a homogeneous material is varied over a range of 4 to 8 centimeters using the clinical techniques for each thickness. If the signal values do not meet this criterion, the medical physicist shall develop a technique chart which meets this criterion.
(f) Image receptor speed uniformity that meets 1 of the following:
(i) For screen-film systems, the difference between the maximum and minimum optical densities of all the cassettes in the facility shall not exceed 0.30.
(ii) For digital systems, the signal-to-noise ratios (SNR) measured in each corner of the image shall be within 15% of the SNR measured at the center of the field of view.
(iii) For digital systems that are not equipped with region of interest signal measurements, the machine shall meet the receptor uniformity requirements specified by the manufacturer.
(g) Breast entrance exposure, average glandular dose, and exposure reproducibility. The coefficient of variation for both air kerma and current-time product (mAs) shall not exceed 0.05. The average glandular dose delivered during a single exposure of a department-approved phantom simulating a standard breast shall not exceed 3.0 milligrays (300 millirads) per exposure. The dose shall be determined with technique factors and conditions used clinically for a standard breast.
(h) Image quality evaluation. An image of a department-approved phantom shall achieve at least the minimum score established in R 333.5689.
(i) Artifact evaluation. System artifacts shall be evaluated with a high-grade, defect-free sheet of homogeneous material large enough to cover the full area of the exposed image receptor on the breast support assembly.
(j) Localization accuracy test. Using a phantom made of gelatin or similar material, the biopsy needle shall capture the intended object in the phantom.

R 333.5689 Phantom image scores.
Rule 689. A stereotactic breast biopsy phantom image score for the tests required in R 333.5687(b) and R 333.5688(h) shall be not less than the values specified in table 689:

TABLE 689

Image System	Standard Mammography Phantom			Mini Stereotactic Phantom		
	Fibers	Speck Groups	Masses	Fibers	Speck Groups	Masses
Screen-film	4.0	3.0	3.0	2.0	2.0	2.0
Digital	5.0	4.0	3.5	3.0	3.0	2.5

R 333.5690 Dosimetry.
Rule 690. The average glandular dose delivered during a single exposure of a department-approved phantom simulating a standard breast shall not exceed 3.0 milligrays (300 millirads) per exposure. The dose shall be determined with technique factors and conditions used clinically for a standard breast.

R 333.5691 Quality assurance for mobile units.
Rule 691. A stereotactic breast biopsy facility shall verify that mammography units used to produce interventional mammograms at more than 1 location meet the requirements in R 333.5687 to R 333.5690. At each examination location and before any examinations are conducted, the facility shall verify satisfactory performance of these units by using a test method that establishes the adequacy of the image quality produced by the unit.

R 333.5692 Use of quality assurance test results.
Rule 692. (1) After completion of tests specified in R 333.5687 to R 333.5691, the facility shall compare the test results to the corresponding specified action limits or the limits established by the facility to verify the image quality of mobile units following a move.
(2) If the test results fall outside of the action limits, the source of the problem shall be identified and corrective actions shall be taken within the following time frames:
(a) Before any further examinations are performed or any films are processed using a component of the mammography system that failed any of the tests described in R 333.5687(a),(b),(d),(f)(i), (f)(iii), (f)(iv); R 333.5688(g) and (h); or R 333.5691.
(b) Within 30 days of the test date for all other tests described in R 333.5687 to R 333.5691.

R 333.5693 Medical physicist surveys.
Rule 693. (1) A stereotactic breast biopsy facility shall annually undergo a survey by a medical physicist or by an individual under the direct supervision of a medical physicist. The survey shall include, at a minimum, the performance of tests to ensure that the facility meets the quality assurance requirements of the annual tests described in R 333.5688 and the weekly phantom image quality test as provided in R 333.5687(b).
(2) The results of all tests conducted by the facility pursuant to R 333.5687 to R 333.5691 and written documentation of any corrective actions taken and their results shall be evaluated for adequacy by the medical physicist performing the survey.
(3) The medical physicist shall prepare a survey report that includes a summary of this review and recommendations for necessary improvements.
(4) The survey report shall be provided to the facility within 30 days of the date of the survey.

(5) The survey report shall be dated and signed by the medical physicist who performed or supervised the survey. If the survey was performed entirely or in part by an individual under the direct supervision of the medical physicist, that individual and the part of the survey that individual performed shall be identified in the survey report.

R 333.5694 Mammography equipment evaluations.
Rule 694. (1) Additional evaluations of stereotactic breast biopsy units or image processors shall be conducted when a new unit or processor is installed, a unit or processor is disassembled and reassembled at the same or a new location, or major components of a stereotactic breast biopsy unit or processor equipment are changed or repaired. These evaluations shall be used to determine whether the new or changed equipment meets the requirements of R 333.5676 to R 333.5678 and R 333.5687 to R 333.5691, as applicable. Problems revealed by the evaluation shall be corrected before the new or changed equipment is put into service for procedures or film processing.
(2) The equipment evaluations specified in subrule (1) of this rule shall be performed by a medical physicist or by an individual under the direct supervision of a medical physicist.

R 333.5695 Cleanliness in facilities using screen-film systems.
Rule 695. (1) A stereotactic breast biopsy facility shall establish and implement protocols for maintaining darkroom, screen, and view box cleanliness.
(2) The facility shall document that all cleaning procedures are performed at the frequencies specified in the protocols.

R 333.5696 Calibration of air kerma measuring instruments.
Rule 696. Instruments used by a medical physicist in his or her annual survey to measure the air kerma or air kerma rate from a stereotactic breast biopsy unit shall be calibrated once every 2 years and each time the instrument is repaired. The instrument calibration shall be traceable to a national standard and calibrated with an accuracy of plus or minus 6% (95% confidence level) in the mammography energy range.

R 333.5697 Infection control.
Rule 697. A stereotactic breast biopsy facility shall establish and comply with procedures to be followed for cleaning and disinfecting stereotactic breast biopsy equipment after contact with blood or other potentially infectious materials. The procedures shall include methods for documenting facility compliance with the infection control procedures.

PART 15. COMPUTED TOMOGRAPHY INSTALLATIONS

R 333.5701 Purpose and scope.
Rule 701. (1) This part establishes requirements governing the use of computed tomography (CT) scanners by, or on behalf of, a health practitioner licensed under article 15 of the act.
(2) This part applies to all registrants who use a CT scanner for the intentional exposure of humans for diagnostic imaging.
(3) A CT scanner is exempt from this part if the scanner meets 1 of the following:
(a) Generates a peak power of 5 kilowatts or less as certified by the manufacturer.
(b) Is used only for attenuation corrections and anatomical markers as part of a positron emission tomography (PET/CT) or single photon emission computed tomography (SPECT/CT) study.

(c) Is used as a simulator solely for treatment planning purposes in conjunction with a megavoltage radiation therapy unit.
(d) Is used solely for intra-operative guidance tomography.
(4) In addition to the requirements of this part, all registrants are subject to applicable parts of these rules and the certificate of need review standards for computed tomography scanner services.

R 333.5703 Definitions.
Rule 703. (1) As used in this part the definitions in 21 C.F.R. 1020.33, "Computed tomography (CT) equipment" (June 10, 2005), are adopted by reference. Copies of these regulations are available for no cost from either of the following sources:
(a) The website of the Michigan department of licensing and regulatory affairs, radiation safety section at http://www.michigan.gov/rss.
(b) The website of the United States department of health & human services, U.S. food and drug administration at http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm.
(2) As used in this part the following definitions apply:
(a) "Computed tomography (CT)" means the production of a tomogram by the acquisition and computer processing of x-ray transmission data. Computed tomography includes the capability of producing axial tomograms.
(b) "CT medical event" means an unintended event where a physician determines that actual damage has occurred to an organ or a physiological system of an individual due to or suspected to be due to exposure to diagnostic radiation from a CT scanner.
(c) "CT scanner" means a CT machine capable of performing CT scans of the head, other body parts, or full body patient procedures including PET/CT and SPECT/CT scanner hybrids if used for CT only procedures.
(d) "Medical physicist" means an individual trained in evaluating the performance of CT scanners, related equipment, and facility quality assurance programs and who meets the requirements in R 333.5707.
(e) "Positron emission tomography (PET)" means an imaging technique that uses positron-emitting radionuclides to produce 3-dimensional images of functional processes in the body.
(f) "Radiologic technologist" means an individual specifically trained in the use of radiographic equipment and the positioning of patients for radiographic examinations and who meets the requirements in R 333.5705.
(g) "Single photon emission computed tomography (SPECT)" means an imaging technique that uses radionuclides to produce 3-dimentional images of functional processes in the body.
(h) "Tomogram" means the depiction of the attenuation properties of a section through a body.

R 333.5705 CT operators.
Rule 705. All CT examinations shall be performed by a radiologic technologist who meets all of the following requirements or by a physician or osteopathic physician licensed under article 15 of the act.
(a) Initial qualifications. Before beginning to perform CT examinations independently, a technologist shall meet both of the following:
(i) Be currently registered by the American registry of radiologic technologists (ARRT), the Canadian association of medical radiation technologists (CAMRT), or the Nuclear Medicine Technology Certification Board (NMTCB).

(ii) Document at least 20 hours of training and experience in operating CT equipment, radiation physics, and radiation protection or have the advanced certification in computed tomography from the ARRT.
(b) Continuing education. A technologist shall be in compliance with the ARRT requirements for continuing education for the imaging modality in which he or she performs services. The continuing education shall include credits pertinent to CT.

R 333.5707 Medical physicist.
Rule 707. A registrant with 1 or more CT scanners shall employ or contract with a medical physicist to review the quality and safety of the operation of the CT scanner. The medical physicist shall meet all of the following:
(a) Initial qualifications. Before beginning to independently provide consultation to a CT facility, a medical physicist shall meet 1 of the following:
(i) Be certified in diagnostic radiological physics or radiological physics by the American board of radiology, or in diagnostic imaging physics by the American board of medical physics, or in diagnostic radiology physics by the Canadian college of physicists in medicine.
(ii) Have a graduate degree in medical physics, radiological physics, physics, or other relevant physical science or engineering discipline from an accredited institution and have formal coursework in the biological sciences with at least 1 course in biology or radiation biology and 1 course in anatomy, physiology, or similar topics related to the practice of medical physics, and have 3 years of documented experience in a clinical CT environment. An accredited institution is a college or university accredited by a regional accrediting organization that has been recognized either by the U.S. department of education (USDE) or by the council for higher education accreditation (CHEA) or both. Individuals with non-U.S. degrees shall provide documentation that their foreign degrees are equivalent to those granted from an approved institution in the U.S. and that the granting institution is equivalent to a regionally accredited institution in the U.S.
(b) Continuing experience. Within 24 months following the date when the requirements of subdivision (a) of this rule were completed, the medical physicist shall have evaluated at least 2 CT scanners in the prior 24-month period.
(c) Continuing education. Within 36 months following the date when the requirements of subdivision (a) of this rule were completed, the medical physicist shall have earned at least 15 continuing medical education units, at least half shall be category 1, in the prior 36-month period. The continuing education shall include credits pertinent to CT.
(d) Reestablishing qualifications. A medical physicist who fails to maintain the required continuing experience or continuing education requirements shall reestablish his or her qualifications before resuming the independent evaluation of CT scanners and facilities, as follows:
(i) A medical physicist who fails to meet the continuing experience requirements of subdivision (b) of this rule shall evaluate a sufficient number of CT scanners, under the supervision of a medical physicist, to meet the requirements of subdivision (b) of this rule.
(ii) A medical physicist who fails to meet the continuing education requirements of subdivision (c) of this rule shall obtain a sufficient number of additional continuing education credits to meet the requirements of subdivision (c) of this rule.

R 333.5709 Equipment requirements.
Rule 709. (1) The regulations in 21 C.F.R. 1020.33(c), (d), (f), (g), (h), (i), and (j), "Computed tomography (CT) equipment" (June 10, 2005), are adopted by reference.

Copies of these regulations are available for no cost from either of the following sources:
(a) The website of the Michigan department of licensing and regulatory affairs, radiation safety section at http://www.michigan.gov/rss.
(b) The website of the United States department of health & human services, U.S. food and drug administration at http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm.
(2) CT equipment shall be maintained in compliance with the requirements of subrule (1) of this rule.

R 333.5711 Enclosures.
Rule 711. (1) A fixed CT scanner enclosure shall be a permanent part of the building or equipment. Portable shields shall not be used for permanent installations.
(2) The degree of protection required for a CT scanner enclosure shall be determined by the workload, use and occupancy factors, and the tube potential, tube current, mechanical movement, and distance. The design shall be subject to approval by the department.
(3) Protective barriers shall be provided in the ceiling, floor, and walls of a fixed CT scanner enclosure.
(4) The control panel for a fixed CT scanner shall be shielded by a protective barrier which cannot be removed from a protective position between the operator and the radiation source during machine operation.
(5) Movable barriers with electrical interlocks shall not be approved in place of compliance with subrule (4) of this rule.
(6) The operator of a fixed CT scanner shall be able to see and communicate with the patient from a shielded position at the control panel. When an observation window is provided, it shall have a lead equivalence at least equal to that required of the control barrier in which it is installed.
(7) Mobile or portable CT scanners used routinely in 1 location shall be considered a fixed installation and shall meet the requirements of subrules (1) to (6) of this rule.

R 333.5713 Conditions of operation.
Rule 713. (1) The CT facility shall establish scanning protocols in consultation with the medical physicist.
(2) The CT operator shall check the display panel before and after performing each scan to make sure the amount of radiation delivered is appropriate for the technique and individual patient. This may be accomplished by reviewing dose indicator devices, if available, or dose indices such as the technique factors. Dose indicators or indices outside of expected values shall be documented and reviewed by an interpreting physician or medical physicist.
(3) A fixed CT scanner shall be operated from a shielded position behind a protective barrier pursuant to R 333.5711(4).
(4) Staff personnel routinely working with or around radiation sources shall not be required by the registrant to restrain patients during CT examinations. If the procedure is permitted personnel exposure shall not exceed the limits in R 333.5057 to R 333.5059 or the procedure is prohibited.
(5) When a patient must be held in position for CT, mechanical supporting or restraining devices shall be used unless contraindicated. If the patient is held by an individual, this individual shall wear protective gloves and a protective apron of 0.5 millimeter minimum lead equivalence and be so positioned that no part of his or her body is struck by the useful beam and that his or her body is as far as possible from the edge of the useful beam.

(6) Only individuals whose presence is necessary are allowed in a fixed CT scanner room during exposure. Each individual, except the patient, shall be protected by at least 0.5 millimeter lead equivalent aprons or a whole body protective barrier.
(7) Personnel monitoring is required in controlled areas for each individual occupationally exposed to ionizing radiation from CT scanner equipment. Individual monitoring devices shall be permanently assigned to each occupationally exposed individual. Monitoring shall be continuous during employment as a radiation worker.
(8) Personnel exposure records shall be kept on permanent available file at the facility where the exposure occurs.
(9) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. Monitoring of all other body parts shall meet the requirements of R 333.5065.
(10) Monitoring devices worn to estimate personnel occupational exposure shall not be worn by the individual when he or she is exposed as a patient for a medical or dental reason.
(11) A CT scanner shall not be left unattended without locking the apparatus, room, or building in some manner which prevents use of the apparatus by unauthorized persons.

R 333.5715 Report and notification of CT medical event.
Rule 715. (1) A CT facility shall report all CT medical events.
(2) The registrant shall submit a written report to the department within 15 days after a physician of the CT facility discovers the CT medical event or within 15 days after the CT facility is notified of the CT medical event by another physician, whichever comes first.
(3) The written report shall include all of the following:
(a) The registrant's name, address, facility registration number, and machine registration tag number as they appear on the registration certificate.
(b) The name of the physician who determined a CT medical event occurred.
(c) The dates of occurrence and discovery of the CT medical event.
(d) A narrative description of the CT medical event.
(e) The cause of the CT medical event.
(f) The effect on the individual who received the exposure.
(g) A narrative detailing corrective action taken or planned to prevent a recurrence.
(h) Certification that the registrant notified the individual or the individual's responsible relative or guardian and, if not, why not.
(i) The name and signature of the person preparing the report.
(4) The report shall not contain the name of the individual who is the subject of the CT medical event or any other information that could lead to identification of the individual.
(5) The registrant shall provide notification of the CT medical event to the referring physician and shall notify the individual who is the subject of the CT medical event not later than 1 week after its discovery, unless the referring physician personally informs the registrant that he or she will inform the individual or that, based on medical judgment, telling the individual would be harmful. The notification of the individual who is the subject of the CT medical event may be made instead to that individual's responsible relative or guardian. The registrant is not required to notify the individual without first consulting the referring physician. If the referring physician or the affected individual cannot be reached within 1 week, the registrant shall notify the individual as soon as possible thereafter. The registrant shall not delay appropriate medical care for the individual, including all necessary remedial care as a result of the CT medical event, because of a delay in notification. If a verbal notification is made, the registrant shall inform the individual or appropriate responsible relative or guardian that a written description of the CT

medical event can be obtained from the registrant upon request. The registrant shall provide a written description if requested.

R 333.5717 Quality control program.
Rule 717. (1) A CT facility shall establish and implement a quality control program under the supervision of the medical physicist. The documented program shall include evaluation of all of the following:
(a) Image quality.
(b) Patient radiation dose.
(c) Personnel radiation protection.
(d) Compliance with the provisions of this part.
(e) Ongoing quality control.
(2) Evaluations and tests shall be performed following written procedures and methods. Corrective action shall be taken and documented according to instructions provided by the medical physicist if the results of an evaluation or test fall outside the control limits.
(3) The medical physicist shall determine the frequency of each test and who may perform the test. An on-site CT radiologic technologist shall be identified to be responsible for the ongoing quality control testing. The tests shall be performed by this technologist or by other personnel qualified by training and experience following written procedures and methods under subrule (2) of this rule.

R 333.5719 Initial and annual medical physicist performance evaluations.
Rule 719. (1) A medical physicist shall complete an initial performance evaluation of the CT scanner before use on human patients and annually thereafter.
(2) A calibrated dosimetry system shall be used to measure the radiation output of a CT scanner. Calibration of the dosimetry system shall be within the preceding 24 months and shall be traceable to a national standard as specified in R 333.5012(1).
(3) A performance evaluation should include the following:
(a) Alignment light accuracy.
(b) Alignment of table to gantry.
(c) Table and gantry tilt.
(d) Slice localization from scanned projection radiograph.
(e) Table increment accuracy.
(f) Slice thickness.
(g) Image quality, including the following:
(i) High-contrast resolution.
(ii) Low-contrast resolution.
(iii) Image uniformity.
(iv) Noise.
(v) Artifact evaluation.
(h) CT number accuracy and linearity.
(i) Dosimetry, including the following:
(i) Dose indicator such as computed tomography dose index (CTDI).
(ii) Patient radiation dose for representative examinations.
(j) Safety evaluation, including the following:
(i) Visual inspection.
(ii) Audible and visual signals.
(iii) Posting requirements.

(iv) Scattered radiation measurements.
(k) Review of the ongoing quality control program, including test results and corrective action.
(4) The medical physicist shall prepare a report that includes all of the following:
(a) A summary of the performance evaluation required under subrule (1) of this rule.
(b) Recommendations for necessary improvements.
(c) Type of dosimetry system used, including the date of the last calibration.
(5) The report required under subrule (4) of this rule shall be provided to the CT facility within 30 days after completion of the evaluation.

R 333.5721 Records and report retention.
Rule 721. A CT facility shall maintain records and reports on file and shall make the records and reports available for review by the department as follows:
(a) Records of personnel no longer employed by the CT facility shall be kept on file until the next inspection following the employee's termination has been completed and the department has determined that the facility is in compliance with the CT personnel requirements.
(b) A report of a CT medical event required under R 333.5715 shall be maintained on file for at least 7 years.
(c) Initial and annual medical physicist performance evaluation reports required under R 333.5719(4) shall be maintained on file for at least 5 years.
(d) Records of the results from the ongoing quality control evaluation required under R 333.5717 shall be maintained on file for at least 2 years.

ADMINISTRATIVE RULES

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

OFFICE OF WASTE MANAGEMENT AND RADIOLOGICAL PROTECTION

IONIZING RADIATION RULES FOR RADIOACTIVE MATERIAL

Filed with the Secretary of State on May 18, 2016

These rules become effective immediately upon filing with the Secretary of State unless adopted under section 33, 44, or 45a(6) of 1969 PA 306. Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the director of the department of environmental quality by section 13521 of 1978 PA 368, MCL 333.13521, and Executive Reorganization Order No. 1996-1, MCL 330.33101)

R 325.5002, R 325.5003, R 325.5004, R 325.5005, R 325.5006, R 325.5007, R 325.5008, R 325.5009, R 325.5010, R 325.5011, R 325.5012, R 325.5013, R 325.5014, R 325.5016, R 325.5017, R 325.5018, R 325.5019, R 325.5020, R 325.5031, R 325.5033, R 325.5041, R 325.5043, R 325.5044, R 325.5046, R 325.5047, R 325.5051, R 325.5052, R 325.5053, R 325.5054, R 325.5055, R 325.5056, R 325.5057, R 325.5058, R 325.5059, R 325.5060, R 325.5061, R 325.5065, R 325.5066, R 325.5067, R 325.5071, R 325.5072, R 325.5073, R 325.5074, R 325.5081, R 325.5087, R 325.5101, R 325.5102, R 325.5117a, R 325.5118, R 325.5119, R 325.5120, R 325.5123, R 325.5124, R 325.5125, R 325.5131, R 325.5133, R 325.5141, R 325.5143, R 325.5144, R 325.5145, R 325.5146, R 325.5147, R 325.5201, R 325.5202, R 325.5203, R 325.5205, R 325.5206, R 325.5208, R 325.5210, R 325.5211, R 325.5212, R 325.5213, R 325.5214, R 325.5215, R 325.5216, R 325.5217, R 325.5218, R 325.5219, R 325.5220, R 325.5221, R 325.5222, R 325.5224, R 325.5225, R 325.5226, R 325.5227, R 325.5228, R 325.5229, R 325.5230, R 325.5231, R 325.5233, R 325.5236, R 325.5237, R 325.5238, R 325.5239, R 325.5240, R 325.5241, R 325.5245, R 325.5246, R 325.5247, R 325.5250, R 325.5253, R 325.5255, R 325.5261, R 325.5262, R 325.5263, R 325.5264, R 325.5265, R 325.5266, R 325.5267, R 325.5268, R 325.5269, R 325.5270, R 325.5271, R 325.5431, R 325.5432, R 325.5435, R 325.5446, R 325.5447, R 325.5450, R 325.5452, R 325.5454, R 325.5455, R 325.5481, and R 325.5511 of the Michigan Administrative Code are amended, and R 325.5021, R 325.5049, R 325.5082, R 325.5083, R 325.5084, R 325.5085, R 325.5086, R 325.5088, R 325.5089, R 325.5090, R 325.5091, R 325.5092, R 325.5103, R 325.5104, R 325.5105, R 325.5106, R 325.5107, R 325.5108, R 325.5109, R 325.5110, R 325.5111, R 325.5111a, R 325.5111b, R 325.5111c, R 325.5112, R 325.5113, R 325.5114, R 325.5115, R 325.5116, R 325.5117, R 325.5121, R 325.5122, R 325.5132, R 325.5148, R 325.5149, R 325.5181, R 325.5182, R 325.5183, R 325.5184, R 325.5185, R 325.5186, R 325.5187, R 325.5188, R 325.5189, R 325.5191, R 325.5192, R 325.5193, R 325.5194, R 325.5195, R 325.5196, R 325.5232, R 325.5256, R 325.5273, R 325.5274, R 325.5281, R 325.5282, R 325.5285, R 325.5286, R 325.5287, R 325.5288, R 325.5289, R 325.5290, R 325.5291, R 325.5293, R 325.5294, R 325.5296, R 325.5297,

R 325.5298, R 325.5299, R 325.5301, R 325.5302, R 325.5303, R 325.5305, R 325.5306, R 325.5307, R 325.5309, R 325.5311, R 325.5312, R 325.5315, R 325.5317, R 325.5321, R 325.5322, R 325.5323, R 325.5325, R 325.5331, R 325.5333, R 325.5337, R 325.5347, R 325.5348, R 325.5351, R 325.5352, R 325.5353, R 325.5355, R 325.5357, R 325.5358, R 325.5359, R 325.5361, R 325.5362, R 325.5365, R 325.5366, R 325.5368, R 325.5371, R 325.5372, R 325.5373, R 325.5375, R 325.5376, R 325.5378, R 325.5379, R 325.5380, R 325.5381, R 325.5383, R 325.5384, R 325.5385, R 325.5386, R 325.5388, R 325.5389, R 325.5390, R 325.5391, R 325.5395, R 325.5396, R 325.5397, R 325.5401, R 325.5402, R 325.5403, R 325.5404, R 325.5405, R 325.5407, R 325.5409, R 325.5411, R 325.5417, R 325.5418, R 325.5421, R 325.5422, R 325.5423, R 325.5425, R 325.5437, R 325.5438, R 325.5439, R 325.5440, R 325.5441, R 325.5442, R 325.5448, R 325.5449, R 325.5461, R 325.5462, R 325.5464, R 325.5465, R 325.5466, R 325.5468, R 325.5471, R 325.5474, R 325.5475, R 325.5482, R 325.5484, R 325.5485, R 325.5486, R 325.5487, R 325.5491, R 325.5492, R 325.5493, R 325.5494, R 325.5495, R 325.5501, R 325.5505, R 325.5506, R 325.5507, R 325.5508, R 325.5601, R 325.5601a, R 325.5602, R 325.5603, R 325.5605, R 325.5606, R 325.5607, R 325.5608, R 325.5609, R 325.5610, R 325.5611, R 325.5612, R 325.5613, R 325.5626, R 325.5627, R 325.5628, R 325.5629, R 325.5630, R 325.5634, R 325.5635, R 325.5637, R 325.5655, R 325.5656, R 325.5657, R 325.5658, R 325.5667, R 325.5668, R 325.5669, R 325.5674, R 325.5675, R 325.5676, R 325.5677, R 325.5678, R 325.5679, R 325.5681, R 325.5682, R 325.5683, R 325.5684, R 325.5685, R 325.5686, R 325.5687, R 325.5688, R 325.5689, R 325.5690, R 325.5691, R 325.5692, R 325.5693, R 325.5694, R 325.5695, R 325.5696, R 325.5697, R 325.5698, R 325.5701, R 325.5703, R 325.5705, R 325.5707, R 325.5709, R 325.5711, R 325.5713, R 325.5715, R 325.5717, R 325.5719, and R 325.5721 of the Michigan Administrative Code are rescinded as follows:

PART 1. GENERAL PROVISIONS

R 325.5002 Hearing procedure.

Rule 2. (1) Prior to the issuance of an order, the department shall afford opportunity for hearing which shall be conducted pursuant to the administrative procedures act of 1969, 1969 PA 306, MCL 24.201 to 24.328.

(2) In a contested case, the department shall conduct a hearing as provided in the administrative procedures act of 1969, 1969 PA 306, MCL 24.201 to 24.328.

R 325.5003 Definitions; Ab to Ai.

Rule 3. (1) "Absorbed dose" means the energy imparted to matter by radiation per unit mass of irradiated material at the place of interest. The special unit of absorbed dose is the rad.

(2) "Accelerator" or "particle accelerator" means a radiation machine designed for or capable of accelerating electrically charged particles such as electrons, protons, or deuterons with an electrical potential in excess of 1 MeV. Radiation machines designed and used exclusively for the production of electron beams or x-radiation for any of the following purposes, except those capable of producing radioactive material in excess of exempt quantities listed in schedule B of Rule 147, are excluded from this definition:

(a) The diagnosis or treatment of patients.

(b) Industrial radiography.

(c) Examination of the microscopic structure of materials.

(d) Manufacturing process control.

(e) Research and development.
(f) Demonstration of scientific principles for educational purposes.
(3) "Accelerator material" means any material made radioactive by exposing it in a particle accelerator.
(4) "Act" means 1978 PA 368, MCL 333.1101 to 333.25211. The terms defined in the act have the same meanings when used in these rules.
(5) "Agreement material" means "byproduct material", "source material", or "special nuclear material in quantities not sufficient to form a critical mass" which is subject to regulation by this state under an agreement between the NRC and this state pursuant to section 274 of the federal atomic energy act of 1954, as amended, being 42. U.S.C. 2011 to 2297H-13.
(6) "Agreement state" means a state with which the NRC has entered into an effective agreement pursuant to section 274b of the atomic energy act of 1954, 42 U.S.C. 2011 to 2297H-13.
(7) "Airborne radioactive material" means any radioactive material dispersed in the air in the form of dusts, fumes, mists, vapors, or gases.
(8) "Airborne radioactivity area" means a room, enclosure, or operating area in which airborne radioactive material exists in concentrations in excess of the amounts specified in column 1, table I of Rules 261 to 269 or a room, enclosure, or operating area in which airborne radioactive material exists in concentrations which, averaged over the number of hours in any week during which individuals are in the area, exceed 25% of the amounts specified in column 1, table I of Rules 261 to 269.

R 325.5004 Definitions; Al to Au.
Rule 4. "Authorized recipient" means any person licensed or otherwise authorized in writing by the department, the federal government or any agency thereof, or an agreement state to possess radioactive material or as authorized to the extent permitted by exemption from these rules.

R 325.5005 Definitions; B.
Rule 5. (1) "Barrier" includes a primary protective barrier, a secondary protective barrier**,** or a personnel barrier.
(2) "Beam axis" means a line from the source through the centers of the gamma-ray fields.
(3) "Beam-limiting device" means a device which provides a means to restrict the dimensions of the gamma-ray field.
(4) "Byproduct material" means any radioactive material, except special nuclear material, yielded in or made radioactive by exposing it to the radiation incident to the process of producing or utilizing special nuclear material**.**

R 325.5006 Definitions; C.
Rule 6. (1) "Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be arranged so that a day is not included in more than 1 calendar quarter nor is a day in any 1 year omitted from inclusion within a calendar quarter. A licensee or registrant shall not change the method observed by him or her of determining calendar quarters for purposes of these rules except at the beginning of a calendar year.
(2) "Controlled area" means a restricted area.
(3) "Curie" means the quantity of radioactive material that decays at the rate of 3.7×10^{10} disintegrations per second (dps). Commonly used submultiples of the curie (Ci) are the

millicurie (mCi), the microcurie (μCi) and the nanocurie (nCi). One millicurie = 0.001 curie = 3.7×10^7 dps. One microcurie = 0.000001 curie = 3.7×10^4 dps. One nanocurie = 0.000000001 curie = 37 dps. Curie is the special unit of measurement of radioactivity.

R 325.5007 Definitions; D.
Rule 7. (1) "Department" means the department of environmental quality.
(2) "Dose" means absorbed dose or dose equivalent as appropriate.
(3) "Dose equivalent" means the absorbed dose in rads times certain modifying factors and is a quantity that expresses on a common scale for all radiation a measure of the postulated effect on a given organ from small amounts of radiation. The special unit of dose equivalent is the rem.

R 325.5008 Definitions; E, F.
Rule 8. (1) "Exposure" means the quotient of dQ by dm where dQ is the absolute value of the total charge of the ions of 1 sign produced in air when all the electrons (negatrons and positrons) liberated by photons in a volume element of air having mass dm are completely stopped in air. The special unit of exposure is the roentgen.
(2) "Exposure rate" means the exposure per unit of time, such as R/min, mR/h.
(3) "Facility" means the location at which 1 or more devices or sources of radiation are installed or located within 1 building or under 1 roof and are under the same administrative control.

R 325.5009 Definitions; G, H.
Rule 9. (1) "High radiation area" means an area, accessible to individuals, in which there exists such radiation, that an individual could receive in any 1 hour a dose in excess of 100 millirems.
(2) "Human use" means the internal or external administration of radiation or radioactive materials to human beings.

R 325.5010 Definitions; I.
Rule 10. (1) "Individual" means a human being.
(2) "Inspection" means an official examination or observation to determine compliance with the act, these rules, license conditions, registration conditions, or orders of the department.
(3) "Installation" means a location, having boundaries specified by the licensee or registrant, where for a period of more than 30 days, 1 or more sources of radiation are used, operated, or stored. A part of a building, an entire building, a plant, or plant site may be designated as an installation.

R 325.5011 Definitions; L.
Rule 11. (1) "Level" means radiation flux or intensity at a specific point. It is sometimes expressed in terms of the dose an individual would receive if he or she were at that point or location.
(2) "License" means a license issued pursuant to part 2 except where otherwise specified.

R 325.5012 Definitions; M to O.
Rule 12. (1) "Manufactured" means produced or prepared for use or sale by an industrial manufacturing process. It includes factory assembly of components but does not include assembly of manufactured parts at the site of use.
(2) "Naturally occurring material" means radioactive material found radioactive in the normal isotopic distribution of elements rather than rendered radioactive by artificial means.

(3) "Nuclear regulatory commission" or "NRC" means the United States nuclear regulatory commission established by section 201 of the federal energy reorganization act of 1974, being Public Law 93-438.
(4) "Occupational dose" means the dose received in the course of occupational exposure as calculated or estimated from dosimeters.
(5) "Occupational exposure" means radiation exposure received by an individual in a restricted area, or in the course of employment in which the individual's duties involve being exposed to radiation. It does not include exposure of an individual to radiation for the purpose of diagnosis or therapy of the individual.

R 325.5013 Definitions; P.
Rule 13. (1) "Particle accelerator" or "accelerator" means a radiation machine designed for or capable of accelerating electrically charged particles such as electrons, protons, or deuterons, with an electrical potential in excess of 1 MeV. Radiation machines designed and used exclusively for the production of electron beams or x-radiation for any of the following purposes, except those capable of producing radioactive material in excess of exempt quantities listed in schedule B of Rule 147, are excluded from this definition:
(a) The diagnosis or treatment of patients.
(b) Industrial radiography.
(c) Examination of the microscopic structure of materials.
(d) Manufacturing process control.
(e) Research and development.
(f) Demonstration of scientific principles for educational purposes.
(2) "Personnel barrier" means a barrier which restricts personnel from potential radiation exposure by restricting access to the vicinity of a source of radiation.
(3) "Personnel monitoring equipment" means a device such as a film badge, pocket dosimeter, or thermoluminescent dosimeter (TLD) designed to be worn or carried by an individual for the purpose of estimating the radiation dose received by him or her.
(4) "Primary protective barrier" means the material, excluding filters, placed in the useful beam to reduce the radiation exposure for protection purposes.

R 325.5014 Definitions; Ra.
Rule 14. (1) "Rad" means 1/100 of a joule of absorbed radiation energy per kilogram of material, or 100 ergs per gram and is the special unit of absorbed dose.
(2) "Radiation" means ionizing radiation.
(3) "Radiation area" means an area, accessible to individuals, in which there exists such radiation that an individual could receive in any 1 hour a dose in excess of 5 millirems, or in any 5 consecutive days a dose in excess of 100 millirems.
(4) "Radiation monitoring" means the periodic or continuous determination of the exposure rate or contamination level in an area (area monitoring) or of the dose received by an individual (personnel monitoring).
(5) "Radiation protection supervisor" means the individual specified by the licensee or registrant who has the authority and the responsibility for radiation protection.
(6) "Radiation worker" means an individual assigned work with or around sources of radiation or who, during the performance of his or her assigned duties, receives or is likely to receive a dose in any calendar quarter in excess of 300 millirems.

(7) "Radioactivity" means the property of certain isotopes of the basic elements of spontaneously emitting nuclear particles or gamma radiation or of emitting x-radiation following orbital electron capture or of undergoing spontaneous fission.

R 325.5016 Definitions; Re to Ro.
Rule 16. (1) "Rem" means the absorbed dose in rads multiplied by appropriate modifying factors which are determined by the quality of radiation and the conditions of exposure and is the special unit of dose equivalent. For the purpose of these regulations, each of the following is considered to be equivalent to a dose of 1rem:
(a) An exposure of 1 roentgen of x or gamma radiation.
(b) A dose of 1 rad due to x, gamma, or beta radiation.
(c) A dose of 0.1 rad due to neutrons or high energy protons.*
(d) A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye.

* If it is more convenient to measure the neutron flux, or equivalent, than to determine the neutron absorbed dose in rads, 1 rem of neutron radiation may, for purposes of these regulations, be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there exists sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to 1 rem may be estimated from the following table:

Neutron Flux Dose Equivalents

Neutron Energy (Mev)	Number of neutrons per square centimeter for a dose equivalent of 1 rem (neutron/cm^2)	Average flux to deliver 100 millirem in 40 hours (neutrons/cm^2 per second)
Thermal	970 x 10^6	670
0.0001	720 x 10^6	500
0.005	820 x 10^6	570
0.02	400 x 10^6	280
0.1	120 x 10^6	80
0.5	43 x 10^6	30
1.0	26 x 10^6	18
2.5	29 x 10^6	20
5.0	26 x 10^6	18
7.5	24 x 10^6	17
10	24 x 10^6	17
10 to 30	14 x 10^6	10

(2) "Research and development" means theoretical analysis, exploration, or experimentation; or the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental

production and testing of models, devices, equipment, materials, and processes. This definition does not apply to human use.

(3) "Restricted area" or "controlled area" means an area access to which is controlled by a licensee or registrant for purposes of protection of individuals from exposure to radiation or radioactive materials. It does not include an area used for residential quarters, although a separate room in a residential building may be set apart as a restricted area.

(4) "Roentgen" means 2.58 x 10^{-4} Coulombs/kilogram of air and is the special unit of exposure.

R 325.5017 Definitions; Se to So.

Rule 17. (1) "Sealed source" means radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal of the radioactive material under the most severe conditions which are likely to be encountered in normal use and handling.

(2) "Secondary protective barrier" means the material placed in the path of scattered and leakage radiation to reduce the radiation exposure for protection purposes.

(3) "Shall" means required to comply with these rules pursuant to the act and enforceable under the act and the administrative procedures act of 1969, 1969 PA 306, MCL 24.201 to 24.328.

(4) "Should" means recommended when practicable to meet optimum radiation safety standards.

(5) "Source material" means uranium or thorium, or any combination thereof, in any physical or chemical form; or ores which contain by weight 1/20 of 1% (0.05%) or more of uranium, thorium or any combination thereof. Source material does not include special nuclear material.

(6) "Source of radiation" means any radioactive material, or any device or equipment containing radioactive material.

R 325.5018 Definitions; Sp to Su.

Rule 18. (1) "Special nuclear material in quantities not sufficient to form a critical mass" means uranium enriched in the isotope U-235 in quantities not exceeding 350 grams of contained U-235; uranium-233 in quantities not exceeding 200 grams; plutonium in quantities not exceeding 200 grams; or any combination of them in accordance with the following formula: For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of the ratios for all of the kinds of special nuclear material in combination shall not exceed "1" (i.e., unity). For example, the following quantities in combination would not exceed the limitation and are within the formula:

$$\frac{175\ (\text{grams contained U-235})}{350}+\frac{50\ (\text{grams U-233})}{200}+\frac{50\ (\text{grams Pu})}{200}=1$$

(2) "Stationary equipment" means equipment that is installed in a fixed location.

(3) "Survey" means a critical evaluation of a facility or area incident to the production, use, release, disposal, or presence of sources of radiation 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.

R 325.5019 Definitions; T.

Rule 19. (1) "Test" means a procedure for determining the characteristics or condition of a source of radiation, or circumstances relative thereto.

(2) "Thermoluminescent dosimeter" or "TLD" means a device used for radiation monitoring which measures integrated dose by the principle of thermoluminescence.
(3) "These rules" means all parts.

R 325.5020 Definitions; U, V.
Rule 20. (1) "Unrefined and unprocessed ore" means ore in its natural form before any processing, such as grinding, roasting, beneficiating or refining.
(2) "Unrestricted area" or "uncontrolled area" means an area access to which is not controlled by a licensee or registrant for purposes of protection of individuals from exposure to radiation or radioactive materials, or an area used for residential quarters.

R 325.5021 Rescinded.

EXEMPTIONS

R 325.5031 Departmental action.
Rule 31. Upon application or upon its own initiative, the department may grant exemptions or exceptions from the requirements of these rules as it determines are authorized by law and will not result in undue hazard to public health and safety or property.

R 325.5033 Nuclear regulatory commission contractors.
Rule 33. An NRC contractor or subcontractor of the following categories operating in this state is exempt from these rules to the extent that the contractor or subcontractor under his or her contract receives, acquires, possesses, uses, or transfers sources of radiation:
(a) A prime contractor performing work for the NRC at United States government-owned or controlled sites.
(b) A prime contractor performing research in, or development, manufacture, storage, testing, or transportation of, atomic weapons or components thereof.
(c) A prime contractor using or operating nuclear reactors or other nuclear devices in a United States government-owned vehicle or vessel.
(d) Any other prime contractor or subcontractor when the state and the NRC jointly determine that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety and that the exemption of such contractor or subcontractor is otherwise appropriate.

RECORDS, INSPECTIONS, TESTS AND ENFORCEMENT

R 325.5041 Records.
Rule 41. A licensee or registrant shall keep records showing the receipt, transfer, and disposal of all sources of radiation. Additional record requirements are specified elsewhere in these rules.

R 325.5042 Inspections.

Rule 42. (1) Under authority of section 13517(1) of the act, the department may enter at all reasonable times upon private or public property to conduct compliance investigations.

(2) Under authority of section 13517(2) of the act, the department may obtain a warrant if necessary for search of property or seizure of sources of radiation or evidence of a violation of the act or any rule or license.
(3) A licensee or registrant shall make available to the department for inspection, all records maintained pursuant to these rules.

R 325.5043 Impounding.
Rule 43. Sources of radiation are subject to impounding pursuant to section 13517(2) of the act.

R 325.5044 Tests.
Rule 44. A licensee or registrant shall perform upon instructions from the department and shall permit the department to perform such reasonable tests as the department deems appropriate or necessary, including tests of the following:
(a) Sources of radiation.
(b) Facilities wherein sources of radiation are used or stored.
(c) Radiation detection and monitoring instruments.
(d) Other equipment and devices used in connection with utilization or storage of licensed or registered sources of radiation.

R 325.5046 Violations.
Rule 46. (1) Under authority of section 13536 of the act, the department may seek a court order enjoining violation of or directing compliance with the act or any rule or order issued thereunder.
(2) Under authority of section 13535 of the act, a person who performs any act for which licensing or registration is required pursuant to these rules when that person is not licensed, registered, or exempted, is guilty of a misdemeanor and may be fined, imprisoned or both.

R 325.5047 Communications.
Rule 47. Communications and reports concerning these rules, and applications filed thereunder, should be addressed to the Michigan Department of Environmental Quality, Office of Waste Management and Radiological Protection, Constitution Hall, 525 West Allegan Street, P.O. Box 30241, Lansing, Michigan 48909.

R 325.5049 Rescinded.

PART 2. LICENSING OF RADIOACTIVE MATERIAL

R 325.5051 Purpose and scope.
Rule 51. (1) This part provides for the licensing of radioactive material. A person shall not own, receive, acquire, possess, use, or transfer radioactive material except as authorized in a specific or general license issued pursuant to this part or as otherwise provided in this part.
(2) In addition to the requirements of this part, a licensee is subject to the requirements of parts 1 and 5.

EXEMPTIONS
SOURCE MATERIAL

R 325.5052 Source material as low percentage of weight.
Rule 52. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than 1/20 of 1% (0.05%) of the mixture, compound, solution, or alloy.

R 325.5053 Unprocessed ore containing source material.
Rule 53. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers unrefined and unprocessed ore containing source material. However, the person shall not refine or process such ore except as authorized in a specific license.

R 325.5054 Thorium used in certain articles.
Rule 54. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers any quantity of thorium contained in the following:
(a) Incandescent gas mantles.
(b) Vacuum tubes.
(c) Welding rods.
(d) Electric lamps for illuminating purposes if each lamp does not contain more than 50 milligrams of thorium.
(e) Germicidal lamps, sunlamps, and lamps for outdoor or industrial lighting if each lamp does not contain more than 2 grams of thorium.
(f) Rare earth metals and compounds, mixtures, and products containing not more than 0.25% by weight thorium, uranium, or any combination of these.

R 325.5055 Source material contained in ceramic and other articles.
Rule 55. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers the following:
(a) Source material contained in the following products:
(i) Glazed ceramic tableware, if the glaze contains not more than 20% by weight source material.
(ii) Glassware, glass enamel, and glass enamel frit containing not more than 10% by weight source material; but not including commercially manufactured glass brick, pane glass, ceramic tile, or other glass, glass enamel, or ceramic used in construction.
(iii) Piezoelectric ceramic containing not more than 2% by weight source material.
(b) Photographic film, negatives, and prints containing uranium or thorium.
(c) A finished product or part fabricated of, or containing, tungsten-thorium or magnesium-thorium alloys, if the thorium content of the alloy does not exceed 4% by weight. The exemption contained in this paragraph does not authorize the chemical, physical, or metallurgical treatment or processing of any such product or part.

R 325.5056 Uranium contained in counterweights.
Rule 56. (1) A person is exempt from this part to the extent that he or she receives, possesses, use's or transfers uranium contained in counterweights installed in aircraft, marinecraft, rockets, projectiles, and missiles, or stored or handled in connection with installation or removal of such counterweights if all of the following conditions are met:

(a) The counterweights are manufactured in accordance with a specific license issued by the department, the NRC, or an agreement state authorizing distribution by the licensee pursuant to this rule or equivalent regulations of the NRC or an agreement state.
(b) Each counterweight has been impressed with the following legend clearly legible through any plating or other covering: "DEPLETED URANIUM".
(c) Each counterweight is durably and legibly labeled or marked with the identification of the manufacturer and the statement: "UNAUTHORIZED ALTERATIONS PROHIBITED".
(2) The requirements specified in subrule (1)(b) and (c) of this rule need not be met by counterweights manufactured before December 31, 1969 if the counterweights are impressed with the legend, “CAUTION - RADIOACTIVE MATERIAL - URANIUM”, as previously required by applicable regulations.
(3) The exemption in this rule does not authorize the chemical, physical**,** or metallurgical treatment or processing of counterweights other than repair or restoration of any plating or other covering.

R 325.5057 Uranium contained in shipping container shields.
Rule 57. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers uranium used as shielding constituting part of any shipping container which is conspicuously and legibly impressed with the legend "CAUTION - RADIOACTIVE SHIELDING - URANIUM" and which meets the specifications for containers for radioactive materials prescribed by section 178.250, specification 55, part 178, of the regulations published by the United States department of transportation, 49 CFR 178.250.

R 325.5058 Thorium contained in lenses.
Rule 58. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers thorium contained in finished optical lenses, if each lens does not contain more than 30% by weight of thorium. The exemption in this rule does not authorize either of the following:
(a) The shaping, grinding, or polishing of such lens or manufacturing processes other than the assembly of such lens into optical systems and devices without any alteration of the lens.
(b) The receipt, possession, use, or transfer of thorium contained in contact lenses, in spectacles or in eyepieces in binoculars or other optical instruments.

R 325.5059 Uranium contained in fire detection units.
Rule 59. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers uranium contained in detector heads for use in fire detection units, if each detector head contains not more than 5 nanocuries of uranium.

R 325.5060 Thorium contained in aircraft engine parts.
Rule 60. A person is exempt from this part to the extent that he or she receives, possesses, uses, or transfers thorium contained in any finished aircraft engine part containing nickel-thoria alloy, if both of the following conditions are met:
(a) The thorium is dispersed in the nickel-thoria alloy in the form of finely divided thoria (thorium dioxide).
(b) The thorium content in the nickel-thoria alloy does not exceed 4% by weight.

R 325.5061 Exemptions do not authorize manufacture.

Rule 61. The exemptions in Rules 54 to 60 do not authorize the manufacture of any of the products described.

R 325.5065 Exempt concentrations.
Rule 65. Except as provided in Rule 66, a person is exempt from this part to the extent that he or she owns, receives, acquires, possesses, uses, or transfers products or materials containing radioactive material in concentrations not in excess of those listed in Rule 146.

R 325.5066. Material transferred to exempt persons.
Rule 66. A person shall not introduce radioactive material into a product or material knowing or having reason to believe that it will be transferred to persons exempt under Rule 65 or equivalent regulations of the NRC or an agreement state.

R 325.5067 Items containing tritium, promethium-147, or radium.
Rule 67. Except for persons who apply tritium, promethium-147, or radium to, or persons who incorporate tritium, promethium-147, or radium into, the following products, a person is exempt from these rules to the extent that he or she owns, receives, acquires, possesses, uses, or transfers the following products:
(a) Timepieces or timepiece hands or dials containing not more than the following specified quantities of radioactive material and not exceeding the following specified levels of radiation:
(i) 25 millicuries of tritium per timepiece.
(ii) 5 millicuries of tritium per hand.
(iii) 15 millicuries of tritium per dial; bezels when used shall be considered as part of the dial.
(iv) 100 microcuries of promethium-147 per watch or 200 microcuries of promethium-147 per any other timepiece.
(v) 20 microcuries of promethium-147 per watch hand or 40 microcuries of promethium-147 per other timepiece hand.
(vi) 60 microcuries of promethium-147 per watch dial or 120 microcuries of promethium-147 per other timepiece dial; bezels when used shall be considered as part of the dial.
(vii) The levels of radiation from hands and dials containing promethium-147 will not exceed, when measured through 50 milligrams per square centimeter of absorber, the following:
(aa) For wrist watches, 0.1 millirad per hour at 10 centimeters from any surface.
(bb) For pocket watches, 0.1 millirad per hour at 1 centimeter from any surface.
(cc) For any other timepiece, 0.2 millirad per hour at 10 centimeters from any surface.
(b) Timepieces or timepiece hands or dials containing not more than the following specified quantities of radium and meeting the following expressed conditions:
(i) 0.15 microcuries of radium per watch.
(ii) 0.03 microcuries of radium per watch hand.
(iii) 0.09 microcuries of radium per watch dial.
(iv) 0.20 microcuries of radium per clock.
(v) 0.04 microcuries of radium per clock hand.
(vi) 0.12 microcuries of radium per clock dial.
(vii) The timepiece is not a pocket watch.
(viii) Timepieces or timepiece hands or dials containing radium that were manufactured before the effective date of these rules.
(ix) The timepiece is marked or coded to identify the date of manufacture and that it contains radium.

(x) The timepiece emits sufficient luminosity, omitting photoactivation, that its dial can be read in the dark during its entire design lifetime.
(c) Lock illuminators containing not more than 15 millicuries of tritium or not more than 2 millicuries of promethium-147 installed in automobile locks. The levels of radiation from each lock illuminator containing promethium-147 will not exceed 1 millirad per hour at 1 centimeter from any surface when measured through 50 milligrams per square centimeter of absorber.
(d) Precision balances containing not more than 1 millicurie of tritium per balance or not more than 0.5 millicurie of tritium per balance part.
(e) Automobile shift quadrants containing not more than 25 millicuries of tritium.
(f) Marine compasses containing not more than 750 millicuries of tritium gas and other marine navigational instruments containing not more than 250 millicuries of tritium gas.
(g) Thermostat dials and pointers containing not more than 25 millicuries of tritium per thermostat.
(h) Electron tubes, including spark gap tubes, power tubes, gas tubes including glow lamps, receiving tubes, microwave tubes, indicator tubes, pick-up tubes, radiation detection tubes and any other completely sealed tube that is designed to conduct or control electrical currents, if the level of radiation due to radioactive material contained in each electron tube does not exceed 1 millirad per hour at 1 centimeter from any surface when measured through 7 milligrams per square centimeter of absorber and if each tube does not contain more than 1 of the following specified quantities of radioactive materials:
(i) 150 millicuries of tritium per microwave receiver protector tube or 10 millicuries of tritium per any other electron tube.
(ii) 1 microcurie of cobalt-60.
(iii) 5 microcuries of nickel-63.
(iv) 30 microcuries of krypton-85.
(v) 5 microcuries of cesium-137.
(vi) 30 microcuries of promethium-147.
(j) Ionizing radiation measuring instruments containing, for purposes of internal calibration or standardization, a source of radioactive material not exceeding the applicable quantity set forth in Rule 147.

R 325.5071 Resins containing scandium-46 for sand consolidation in oil wells.
Rule 71. A person is exempt from these rules to the extent that he or she owns, receives, acquires, possesses, uses, or transfers synthetic plastic resins containing scandium-46 which are designed for sand consolidation in oil wells if the resins were manufactured or imported in accordance with a specific license issued by the NRC, or were manufactured in accordance with the specifications contained in a specific license issued by the department or an agreement state to the manufacturer of such resins pursuant to licensing requirements equivalent to those in sections 32.16 and 32.17 of 10 CFR Part 32 of the regulations of the NRC. This exemption does not authorize the manufacturer of resins containing scandium-46.

R 325.5072 Gas and aerosol detectors.
Rule 72. Except for persons who manufacture, process, or produce gas and aerosol detectors, a person is exempt from these rules to the extent that he or she owns, receives, acquires, possesses, uses, or transfers the following:
(a) Byproduct material in gas and aerosol detectors designed to protect life or property from fires and airborne hazards, if the detectors containing byproduct material were manufactured, imported, or transferred in accordance with a specific license issued by the NRC pursuant to

section 32.26 of 10 CFR Part 32, which license authorizes the transfer of the detectors to persons who are exempt from regulatory requirements.

(b) Naturally occurring material in gas and aerosol detectors designed to protect life or property from fires and airborne hazards, if the detectors containing naturally occurring material were manufactured, imported, or transferred in accordance with a specific license issued by the department or an agreement state pursuant to equivalent conditions as in section 32.26 of 10 CFR Part 32, which license authorizes the transfer of the detectors to persons who are exempt from regulatory requirements.

R 325.5073 Self-luminous products containing tritium, krypton-85, promethium-147, or radium 226.

Rule 73. (1) Except for a person who manufactures, processes, or produces self-luminous products, a person is exempt from these regulations to the extent that he or she owns, receives, acquires, possesses, uses, or transfers the following:

(a) Tritium, krypton-85, or promethium-147 in self-luminous products manufactured, processed, imported, or transferred in accordance with a specific license issued by the NRC pursuant to section 32.22 of 10 CFR Part 32, which license authorizes the transfer of the product to persons who are exempt from regulatory requirements.

(b) Naturally occurring material in self-luminous products manufactured, processed, imported, or transferred in accordance with a specific license issued by the department or an agreement state pursuant to equivalent conditions as in section 32.22 of 10 CFR Part 32.

(2) The exemptions in subrule (1) of this rule do not apply to tritium, krypton-85, promethium-147, or naturally occurring material used in products for frivolous purposes or in toys or adornments.

EXEMPTIONS
RADIOACTIVE MATERIAL OTHER THAN SOURCE MATERIAL

R 325.5074 Exempt quantities.

Rule 74. (1) Except as provided in subrules (3) and (4) of this rule, a person is exempt from these rules to the extent that he or she owns, receives, acquires, possesses, uses, or transfers a byproduct, naturally occurring, or accelerator material in individual quantities each of which does not exceed the applicable quantity set forth in Rule 147.

(2) A person who possesses radioactive material formerly received or acquired under the general license provided in 10 CFR Part 31, § 31.4 of the NRC regulations is exempt from the requirements for a license set forth in this part to the extent that he or she owns, possesses, uses, or transfers such radioactive material.

(3) Subrule (1) of this rule does not authorize the production, packaging, or repackaging of radioactive material for purposes of commercial distribution, or the incorporation of radioactive material into products intended for commercial distribution.

(4) A person, for purposes of commercial distribution, shall not transfer radioactive material in the individual quantities set forth in Rule 147, knowing or having reason to believe that such quantities of radioactive material will be transferred to persons exempt under subrule (1) of this rule or equivalent regulations of the NRC or an agreement state, except in accordance with a specific license issued by the NRC pursuant to section 32.18 of 10 CFR Part 32 which license states that the radioactive material may be transferred by the licensee to persons exempt under subrule (1) of this rule or the equivalent regulations of the NRC or an agreement state.

GENERAL LICENSES

R 325.5081 Types of licenses.
Rule 81. Licenses for radioactive materials are of 2 types: general or specific. General licenses provided in this part are effective without the filing of applications with the department or the issuance of licensing documents to particular persons. Specific licenses are issued to named persons upon applications filed pursuant to this part.

R 325.5082 Rescinded.

R 325.5083 Rescinded.

R 325.5084 Rescinded.

R 325.5085 Rescinded.

R 325.5086 Rescinded.

R 325.5087 Ownership of radioactive material.
Rule 87. This rule is a general license issued to own radioactive material without regard to quantity. Notwithstanding any other provisions of this part, this general license does not authorize the manufacture, production, transfer, receipt, possession**,** or use of radioactive material.

R 325.5088 Rescinded.

R 325.5089 Rescinded.

R 325.5090 Rescinded.

R 325.5091 Rescinded.

R 325.5092 Rescinded.

SPECIFIC LICENSES

R 325.5101 Applications.
Rule 101. (1) An application for a specific license shall be filed on a form prescribed by the department and shall be accompanied by the appropriate license fee as specified in Rules 141 to 145.
(2) The application shall be signed by the applicant or licensee or a person authorized to act for and on his or her behalf.
(3) An application for a license may include a request for a license authorizing 1 or more activities.

(4) In his or her application, the applicant may incorporate by reference information contained in previous applications, statements, or reports filed with the department if the references are clear and specific.

(5) The department, at any time after the filing of the original application, and before the expiration of the license, may require further statements in order for the department to determine whether the application will be granted or denied or whether a license will be modified or revoked.

(6) The department may make available the application and documents submitted to the department for public inspection except that the department may withhold any document or part thereof from public inspection if disclosure of its content is not required in the public interest and would adversely affect the interest of a person concerned.

R 325.5102 General requirements for specific licenses.

Rule 102. The department shall approve a license application if it determines all of the following:

(a) The applicant or the designated individual user is qualified by reason of training and experience to use the material in question for the purpose requested in accordance with these rules in such a manner as to minimize danger to public health and safety or property.

(b) The applicant's proposed equipment, facilities**,** and procedures are adequate to minimize danger to public health and safety or property.

(c) The issuance of the license will not be inimical to the health and safety of the public.

(d) The applicant satisfies any applicable special requirements in Rule 117a.

R 325.5103 Rescinded.

R 325.5104 Rescinded.

R 325.5105 Rescinded.

R 325.5106 Rescinded.

R 325.5107 Rescinded.

R 325.5108 Rescinded.

R 325.5109 Rescinded.

R 325.5110 Rescinded.

R 325.5111 Rescinded.

R 325.5111a Rescinded.

R 325.5111b Rescinded.

R 325.5111c Rescinded.

R 325.5112 Rescinded.

R 325.5113 Rescinded.

R 325.5114 Rescinded.

R 325.5115 Rescinded.

R 325.5116 Rescinded.

R 325.5117 Rescinded.

SPECIAL REQUIREMENTS FOR ISSUANCE OF CERTAIN SPECIFIC LICENSES

R 325.5117a Particle accelerator licenses.

Rule 117a. (1) A particle accelerator capable of producing radioactive material in excess of exempt quantities listed in schedule B of Rule 147 shall not be operated in a manner likely to produce such quantities of radioactive material unless a person is authorized to operate in a specific license issued pursuant to this rule.

(2) Subject to Rule 122 a person shall submit an application for a specific license to operate a particle accelerator subject to this rule in accordance with Rule 101.

(3) The department shall issue a specific license for a particle accelerator subject to licensing under this rule when it determines all of the following:

(a) The applicant will have an adequate program for training accelerator operators and submits to the department a schedule or description of the program which specifies the following:

(i) Initial training.

(ii) Periodic training.

(iii) On-the-job training.

(iv) Means to be used by the licensee to determine the operator's knowledge and understanding of and ability to comply with department rules and licensing requirements, and the operating and emergency procedures of the applicant.

(b) The applicant has established and submits to the department satisfactory written operating and emergency procedures.

(c) The applicant will have an adequate internal inspection system, or other management control, to assure that license provisions, rules, and the applicant's operating and emergency procedures are followed by operators and all other individuals associated with the accelerator operation.

(d) The applicant submits to the department a description of his or her overall organizational structure pertaining to the particle accelerator program, including specified delegations of authority and responsibility for operation of the program.

(e) The applicant has applied for or has been issued a valid license to own, receive, acquire, possess, use, and transfer radioactive material produced or used in connection with accelerator operation.

R 325.5118 Issuance of specific licenses.

Rule 118. (1) As used in this rule, "as it deems appropriate or necessary" means as the department determines is appropriate or necessary in order to minimize danger to public health and safety or property; and prevent loss or theft of material subject to this part.
(2) Upon a determination that an application meets the requirements of the act and these rules the department shall issue a specific license authorizing the proposed activity in such form and containing such conditions and limitations as it deems appropriate or necessary.
(3) The department may incorporate in any license at the time of issuance, or thereafter, by appropriate rule or order, such additional requirements and conditions with respect to the licensee's receipt, possession, use, and transfer of radioactive material subject to this part as it deems appropriate or necessary.
(4) The department may require such reports and the keeping of such records, and may provide for such inspections of activities under the license as it deems appropriate or necessary.

R 325.5119 Specific terms and conditions of licenses.
Rule 119. (1) A license issued under this part is subject to all the provisions of the act, now or hereafter in effect, and to all rules and orders of the department.
(2) A license issued or granted under this part and a right to possess or utilize radioactive material granted by a license issued under this part shall not be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of any license to any person unless the department, after securing full information, finds that the transfer is in accordance with the provisions of the act, and gives its consent in writing.
(3) A person licensed by the department under this part shall confine his or her use and possession of the material licensed to the locations and purposes authorized in the license.

R 325.5120 Expiration, renewal, and amendment of licenses.
Rule 120. (1) Except as provided in subrule (3) of this rule, each specific license expires at the end of the day, in the months and year stated therein.
(2) An application for renewal of a specific license shall be filed in accordance with Rule 101.
(3) If a licensee, not less than 30 days before expiration of his or her existing license, has filed an application in proper form for renewal or for a new license authorizing the same activities, the existing license does not expire until the application has been finally determined by the department.
(4) An application for amendment of a license shall be filed in accordance with Rule 101 and shall specify the respects in which the licensee desires his or her license to be amended and the grounds for such amendment.
(5) In considering an application by a licensee to renew or amend his or her license, the department shall apply the criteria set forth in Rules 102 and 117a.

R 325.5121 Rescinded.

R 325.5122 Rescinded.

R 325.5123 Transfer of material.
Rule 123. (1) A licensee shall not transfer radioactive material except as authorized pursuant to this rule.
(2) Preparation for shipment and transport of radioactive material shall be in accordance with the provisions of Rule 255.
(3) A licensee may transfer radioactive material to the following:

(a) The department.
(b) The NRC.
(c) A person exempt from the rules in this part to the extent permitted under the exemption.
(d) A person authorized to receive the material under terms of a general license or its equivalent, or a specific license or equivalent licensing document, issued by the department, the NRC, or an agreement state, or to a person otherwise authorized to receive the material by the federal government or any agency thereof, the department, or an agreement state.
(e) As otherwise authorized by the department in writing.

R 325.5124 Modification, revocation, and termination of licenses.
Rule 124. (1) The terms and conditions of a license are subject to amendment, revision, or modification or the license may be suspended or revoked by reason of amendments to the act, or by reason of rules and orders issued by the department.
(2) A license may be revoked, suspended, or modified, in whole or in part, for the following:
(a) A material false statement in the application or any statement of fact required under the act.
(b) A condition revealed by the application or statement of fact or any report, record, or inspection or other means which would warrant the department to refuse to grant a license on an original application.
(c) A violation of, or failure to observe, any of the terms and conditions of the act, the license, or any rule or order of the department.
(3) Except in a case of willfulness or where the public health, interest, or safety requires otherwise, a license shall not be modified, suspended, or revoked unless, before the institution of proceedings therefor, facts or conduct which may warrant the action have been called to the attention of the license in writing and the licensee has been accorded an opportunity to demonstrate or achieve compliance with all lawful requirements.
(4) The department may terminate a specific license upon request submitted by the licensee to the department in writing.

R 325.5125 Environmental impact report.
Rule 125. An application for a license to receive and possess radioactive material for commercial waste disposal by land burial in this state or for the conduct of any other activity which the department determines will significantly affect the quality of the environment shall be filed at least 9 months before the beginning of construction of the plant or facility in which the activity will be conducted and shall be accompanied by an environmental report. The report shall contain information similar to the information specified in Rules 212 and 238.

RECIPROCITY

R 325.5131 General license for limited period.
Rule 131. This rule applies to a general license issued to a person who holds a specific license from the NRC or an agreement state issued by the agency having jurisdiction where the licensee maintains an office for directing the licensed activity and at which radiation safety records are normally maintained, to conduct the activities authorized in the license in this state for a period not in excess of 180 days in any calendar year if all of the following conditions are met:
(a) The license does not limit the activity authorized by it to specified installations or locations.
(b) The licensee notifies the department in writing at least 3 days prior to engaging in the activity. The notification shall indicate the location, period, and type of proposed possession and

use within this state, and shall be accompanied by a copy of the pertinent license. If, for a specific case, the 3-day period would impose an undue hardship on the licensee, he or she may obtain permission to proceed sooner upon application to the department. The department may waive the requirement for filing additional written notifications during the remainder of the calendar year following the receipt of the initial notification from a person engaging in activities under the general license provided in this rule.

(c) The licensee complies with all applicable rules of the department and with all the terms and conditions of his or her license, except terms and conditions which may be inconsistent with applicable rules of the department.

(d) The licensee supplies such other information as the department may request.

(e) The licensee does not transfer or dispose of radioactive material possessed or used under the general license provided in this rule except by transfer to a person specifically licensed by the department or by the NRC to receive such material, or exempt from the requirements for a license for such material under Rule 65.

R 325.5132 Rescinded.

R 325.5133 Limited acceptance of reciprocal licenses.

Rule 133. The department may withdraw, limit, or qualify its acceptance of a specific license or equivalent licensing document issued by another agency, or any product distributed pursuant to such licensing document, upon determining that the action is necessary to prevent undue hazard to public health and safety or property.

LICENSE FEES

R 325.5141 Application fees.

Rule 141. (1) A license application for which a fee is prescribed in Rule 144 shall be accompanied by a remittance in the full amount of the fee unless the applicant has been exempted from fee payment under Rule 143.

(2) An application will not be accepted for filing or processed before payment of the full amount specified unless exempted from fee payment. An application for which a remittance is not received may be returned to the applicant.

(3) All application fees shall be retained irrespective of the department's disposition of the application or a withdrawal of the application.

(4) The application fee serves as the license fee for the first year after issuance of the license irrespective of the time interval between date of application and date of issuance.

R 325.5143 Exemptions.

Rule 143. (1) Application fees or annual fees are not required for licenses applied for by, or issued to the following:

(a) An agency of this state or any political subdivision thereof for radioactive material or accelerators to be used primarily for services rendered on a charitable basis or in connection with a facility used primarily for charitable purposes.

(b) A nonprofit educational institution for radioactive material or accelerators to be used exclusively for teaching or training purposes or in connection with a facility used exclusively for teaching or training purposes.

(2) Application fees or annual fees are not required for licenses authorizing the use of source material as shielding only in devices and containers, but all other licensed radioactive material in the device or container is subject to the fees prescribed in Rule 144 unless otherwise exempted under this rule.

R 325.5144 Fee schedule.

Rule 144. Applicants for specific radioactive material licenses and licensees issued these licenses shall pay the appropriate license fees and shall be subject to the footnotes specified in the following fee schedule unless exempted under Rule 143.

SCHEDULE OF RADIOACTIVE MATERIAL LICENSE FEES

Category of License [1]	Application Fee [2]	Annual Fee[3] [4]
1. Radioactive Material Other than Special Nuclear, Byproduct, or Source Material:		
A. All other specific radioactive material licenses except those in categories 2A or 2B.	$50.00	$50.00
2. Waste Disposal:		
A. Waste disposal licenses specifically authorizing the receipt of waste radioactive material from other persons for the purpose of commercial disposal by the waste disposal licensee by land burial.	$3,000.00	$3,000.00
B. Waste disposal licenses specifically authorizing the receipt of waste radioactive material from other persons for the purpose of commercial disposal by the waste disposal licensee by transfer to another person authorized to receive such material.	$400.00	$400.00

FOOTNOTES
to
SCHEDULE OF RADIOACTIVE MATERIAL LICENSE FEES

[1] Amendments based on applications filed after the due date of the annual license fee reducing the scope of a licensee's program or cancelling a license, will not entitle the licensee to a partial refund of an annual fee that has been paid by the licensee for the year in which such amendment or cancellation occurs. Applications for amendments increasing the scope of a program to a higher fee category will not be accepted for filing unless accompanied by the prescribed fee less the amount of the currently prescribed fee for the activities already licensed.

[2] Applications for specific licenses covering more than 1 fee category shall be accompanied by the prescribed fee for each category.

[3] Payment of the prescribed annual fee does not automatically renew the license for which the fee is paid. Renewal applications shall be filed in accordance with the requirements of Rule 120. Applications for reissuance of licenses that have expired because a timely renewal application was not filed shall be accompanied by the prescribed application fee.

[4] The annual fee will be waived where an application is filed to cancel the license prior to the due date of the annual fee, and the amount of the annual fee will be reduced where an application is filed to amend the license to reduce its scope before the due date of the annual fee. *However*, an annual fee will not be waived or reduced unless the application filed before the due date of the fee contains all the information necessary to permit the department to complete the requested action

R 325.5145 Payment of fees.

Rule 145. (1) License fee payments shall be by check, draft, or money order payable to the "State of Michigan".

(2) In any case where the department finds that a licensee has failed to pay the applicable annual fee required in this part, the department may suspend or revoke the license or may issue such order with respect to licensed activities as the department determines to carry out these rules and the act.

SCHEDULES A AND B

R 325.5146 Schedule A - Exempt concentrations.

Rule 146. See Rule 65.

Element (atomic number)	Radionuclide	Column I Gas concentration µCi/ml*	Column II Liquid and solid concentration µCi/ml**
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	Ar 37	1×10^{-3}	
	Ar 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}

Element (atomic number)	Radionuclide	Column I Gas concentration µCi/ml*	Column II Liquid and solid concentration µCi/ml**
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}
Europium (63)	Eu 152 ($T_{1/2}$=9.2 hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}

Element (atomic number)	Radionuclide	Column I Gas concentration µCi/ml*	Column II Liquid and solid concentration µCi/ml**
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (41) (Columbium)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorous (15)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210		7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium(59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226		1×10^{-7}
	Ra 228		3×10^{-7}
Radon (86)	Rn 220		1×10^{-8}
	Rn 222		1×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}

Element (atomic number)	Radionuclide	Column I Gas concentration µCi/ml*	Column II Liquid and solid concentration µCi/ml**
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (74)	W 181		4×10^{-3}
(Wolfram)	W 187		7×10^{-4}

Element (atomic number)	Radionuclide	Column I Gas concentration µCi/ml*	Column II Liquid and solid concentration µCi/ml**
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Zr 97		2×10^{-4}
Beta and/or gamma emitting radioactive material not listed above with half-life less than 3 years.		1×10^{-10}	1×10^{-6}

* Values are given in Column 1 only for those materials normally used as gases.

** µCi/gm for solids.

NOTE 1: Many radionuclides disintegrate into nuclides which are also radioactive. In expressing the concentrations in Schedule A the activity stated is that of the parent nuclide and takes into account the daughters.

NOTE 2: For purposes of Rule 65 where there is involved a combination of nuclides, the limit for the combination should be derived as follows: Determine for each nuclide in the product the ratio between the concentration present in the product and the exempt concentration established in Schedule A for the specific nuclide when not in combination. The sum of such ratios may not exceed "1" (i.e., unity).

EXAMPLE:

$$\frac{\text{Concentration of Nuclide A in Product}}{\text{Exempt concentration of Nuclide A}} + \frac{\text{Concentration of Nuclide B in Product}}{\text{Exempt concentration of Nuclide B}} \leq 1$$

R 325.5147 Schedule B - Exempt quantities.
Rule 147. See Rule 74.

Radionuclide	Microcuries
Antimony 122 (Sb 122)	100
Antimony 124 (Sb 124)	10

Antimony 125 (Sb 125)	10
Arsenic 73 (As 73)	100
Arsenic 74 (As 74)	10
Arsenic 76 (As 76)	10
Arsenic 77 (As 77)	100
Barium 131 (Ba 131)	10
Barium 133 (Ba 133)	10
Barium 140 (Ba 140)	10
Bismuth 210 (Bi 210)	1
Bromine 82 (Br 82)	10
Cadmium 109 (Cd 109)	10
Cadmium 115m (Cd 115m)	10
Cadmium 115 (Cd 115)	100
Calcium 45 (Ca 45)	10
Calcium 47 (Ca 47)	10
Carbon 14 (C 14)	100
Cerium 141 (Ce 141)	100
Cerium 143 (Ce 143)	100
Cerium 144 (Ce 144)	1
Cesium 131 (Cs 131)	1,000
Cesium 134m (Cs 134m)	100
Cesium 134 (Cs 134)	1
Cesium 135 (Cs 135)	10
Cesium 136 (Cs 136)	10
Cesium 137 (Cs 137)	10
Chlorine 36 (Cl 36)	10
Chlorine 38 (Cl 38)	10
Chromium 51 (Cr 51)	1,000
Cobalt 58m (Co 58m)	10
Cobalt 58 (Co 58)	10
Cobalt 60 (Co 60)	1
Copper 64 (Cu 64)	100
Dysprosium 165 (Dy 165)	10
Dysprosium 166 (Dy 166)	100
Erbium 169 (Er 169)	100
Erbium 171 (Er 171)	100
Europium 152 (Eu 152) 9.2 h	100
Europium 152 (Eu 152) 13 yr	1
Europium 154 (Eu 154)	1
Europium 155 (Eu 155)	10
Fluorine 18 (F18)	1,000
Gadolinium 153 (Gd 153)	10
Gadolinium 159 (Gd 159)	100
Gallium 72 (Ga 72)	10
Germanium 71 (Ge 71)	100
Gold 198 (Au 198)	100

Gold 199 (Au 199)	100
Hafnium 181 (Hf 181)	10
Holmium 166 (Ho 166)	100
Hydrogen 3 (H 3)	1,000
Indium 113m (In 113m)	100
Indium 114m (In 114m)	10
Indium 115m (In 115m)	100
Indium 115 (In 115)	10
Iodine 125 (I 125)	1
Iodine 126 (I 126)	1
Iodine 129 (I 129)	0.1
Iodine 131 (I 131)	1
Iodine 132 (I 132)	10
Iodine 133 (I 133)	1
Iodine 134 (I 134)	10
Iodine 135 (I 135)	10
Iridium 192 (Ir 192)	10
Iridium 194 (Ir 194)	100
Iron 55 (Fe 55)	100
Iron 59 (Fe 59)	10
Krypton 85 (Kr 85)	100
Krypton 87 (Kr 87)	10
Lanthanum 140 (La 140)	10
Lutetium 177 (Lu 177)	100
Manganese 52 (Mn 52)	10
Manganese 54 (Mn 54)	10
Manganese 56 (Mn 56)	10
Mercury 197m (Hg 197m)	100
Mercury 197 (Hg 197)	100
Mercury 203 (Hg 203)	10
Molybdenum 99 (Mo 99)	100
Neodymium 147 (Nd 147)	100
Neodymium 149 (Nd 149)	100
Nickel 59 (Ni 59)	100
Nickel 63 (Ni 63)	10
Nickel 65 (Ni 65)	100
Niobium 93m (Nb 93m)	10
Niobium 95 (Nb 95)	10
Niobium 97 (Nb 97)	10
Osmium 185 (Os 185)	10
Osmium 191m (Os 191m)	100
Osmium 191 (Os 191)	100
Osmium 193 (Os 193)	100
Palladium 103 (Pd 103)	100
Palladium 109 (Pd 109)	100
Phosphorus 32 (P 32)	10

Platinum 191 (Pt 191)	100
Platinum 193m (Pt 193m)	100
Platinum 193 (Pt 193)	100
Platinum 197m (Pt 197m)	100
Platinum 197 (Pt 197)	100
Polonium 210 (Po 210)	0.1
Potassium 42 (K 42)	10
Praseodymium 142 (Pr 142)	100
Praseodymium 143 (Pr 143)	100
Promethium 147 (Pm 147)	10
Promethium 149 (Pm 149)	10
Rhenium 186 (Re 186)	100
Rhenium 188 (Re 188)	100
Rhodium 103m (Rh 103m)	100
Rhodium 105 (Rh 105)	100
Rubidium 86 (Rb 86)	10
Rubidium 87 (Rb 87)	10
Ruthenium 97 (Ru 97)	100
Ruthenium 103 (Ru 103)	10
Ruthenium 105 (Ru 105)	10
Ruthenium 106 (Ru 106)	1
Samarium 151 (Sm 151)	10
Samarium 153 (Sm 153)	100
Scandium 46 (Sc 46)	10
Scandium 47 (Sc 47)	100
Scandium 48 (Sc 48)	10
Selenium 75 (Se 75)	10
Silicon 31 (Si 31)	100
Silver 105 (Ag 105)	10
Silver 110m (Ag 110m)	1
Silver 111 (Ag 111)	100
Sodium 24 (Na 24)	10
Strontium 85 (Sr 85)	10
Strontium 89 (Sr 89)	1
Strontium 90 (Sr 90)	0.1
Strontium 91 (Sr 91)	10
Strontium 92 (Sr 92)	10
Sulphur 35 (S 35)	100
Tantalum 182 (Ta 182)	10
Technetium 96 (Tc 96)	10
Technetium 97m (Tc 97m)	100
Technetium 97 (Tc 97)	100
Technetium 99m (Tc 99m)	100
Technetium 99 (Tc 99)	10
Tellurium 125m (Te 125m)	10
Tellurium 127m (Te 127m)	10

Tellurium 127 (Te 127)	100
Tellurium 129m (Te 129m)	10
Tellurium 129 (Te 129)	100
Tellurium 131m (Te 131m)	10
Tellurium 132 (Te 132)	10
Terbium 160 (Tb 160)	10
Thallium 200 (Tl 200)	100
Thallium 201 (Tl 201)	100
Thallium 202 (Tl 202)	100
Thallium 204 (Tl 204)	10
Thulium 170 (Tm 170)	10
Thulium 171 (Tm 171)	10
Tin 113 (Sn 113)	10
Tin 125 (Sn 125)	10
Tungsten 181 (W 181)	10
Tungsten 185 (W 185)	10
Tungsten 187 (W 187)	100
Vanadium 48 (V 48)	10
Xenon 131m (Xe 131m)	1,000
Xenon 133 (Xe 133)	100
Xenon 135 (Xe 135)	100
Ytterbium 175 (Yb 175)	100
Yttrium 90 (Yb 90)	10
Yttrium 91 (Yb 91)	10
Yttrium 92 (Yb 92)	100
Yttrium 93 (Yb 93)	100
Zinc 65 (Zn 65)	10
Zinc 69m (Zn 69m)	100
Zinc 69 (Zn 69)	1,000
Zirconium 93 (Zr 93)	10
Zirconium 95 (Zr 95)	10
Zirconium 97 (Zr 97)	10
Any radionuclide not listed above other than alpha emitting radioactive material	0.1

R 325.5148 Rescinded.

R 325.5149. Rescinded.

PART 4. REGISTRATION OF RADIATION MACHINES

R 325.5181 Rescinded.

R 325.5182 Rescinded.

R 325.5183 Rescinded.

R 325.5184 Rescinded.

R 325.5185 Rescinded.

R 325.5186 Rescinded.

R 325.5187 Rescinded.

R 325.5188 Rescinded.

R 325.5189 Rescinded.

R 325.5191 Rescinded.

R 325.5192 Rescinded.

R 325.5193 Rescinded.

R 325.5194 Rescinded.

R 325.5195 Rescinded.

R 325.5196 Rescinded.

PART 5. STANDARDS FOR PROTECTION AGAINST RADIATION

R 325.5201 Purpose and scope.

Rule 201. (1) This part establishes standards for protection against radiation hazards. Except as otherwise specifically provided this part applies to all licensees and registrants.

(2) In addition to complying with requirements 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 use of sources of radiation in the public interest.

R 325.5202 Intentional exposure of humans.

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

(2) Intentional exposure of individuals to radiation or concentrations of radioactive material for diagnostic or therapeutic purposes shall be limited to supervision or prescriptions by licensed members of the healing arts.

PERMISSIBLE DOSES, LEVELS AND CONCENTRATIONS

R 325.5203 Exposure of individuals to radiation.

Rule 203. (1) Except as provided in subrules (3),(4), and (6) of this rule, a licensee or registrant shall not receive, possess, use, or transfer sources of radiation in 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.

(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.

(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) of this rule, under any of the following conditions:

(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.

(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 or her last birthday.

(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.

(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) of this rule, 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 or her accumulated occupational dose does not exceed 5 (N-18) rems where "N" equals the individual's age in years at his or her last birthday.

(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.

(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. Teams may include police, fire, ambulance, and paramedical crews acting in the course of their assigned duties.

R 325.5205 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.

R 325.5206 Determination of accumulated dose.

Rule 206. (1) This rule applies to licensees or registrants who propose, pursuant to Rule 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 do all of the following:

(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 Rule 203 (3) or (4).

(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 or she 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 is assumed that the individual has received the occupational dose specified in whichever of the following columns apply:

Part of Body	COLUMN 1 Assumed Dose in Rems for Calendar Quarters Before January 1, 1961	COLUMN 2 Assumed Dose in Rems For Calendar Quarters Beginning on or After 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.

R 325.5208 Exposure of individuals to radioactive material in restricted areas.

Rule 208. (1) A licensee shall not receive, acquire, possess, use, or transfer radioactive material in such a manner as to cause an individual in a restricted area to be exposed to airborne radioactive material in an average concentration in excess of the limits specified in table I of appendix A in Rules 261 to 270. "Expose," as used in this rule, means that the individual is present in a region where an airborne concentration exist. An allowance shall not be made for the use of protective clothing or equipment, or particle size, except as authorized by the department pursuant to subrule (3) or (4) of this rule.

(2) The limits given in table I of appendix A in Rules 261 to 270, are based upon an individual being exposed to the specified concentrations for the reference period of 40 hours in any 7 consecutive days. In any such period where an individual has been exposed for less than the 40 hours, the limits specified may be increased proportionately. In any such period where an individual has been exposed for more than 40 hours, the limits specified in the table shall be decreased proportionately.

(3) The department may authorize a licensee to expose an individual in a restricted area to airborne concentrations in excess of the limits specified in table I of appendix A in Rules 261 to 270, upon receipt of an application demonstrating that the concentration is composed in whole or in part of particles of such size that the particles are not respirable and that the individual will not inhale the concentrations in excess of the limits established in the table. An application submitted pursuant to this subrule shall include an analysis of particle sizes in the concentrations and description of the methods used in determining the particle sizes.

(4) The department may authorize a licensee to expose an individual in a restricted area to airborne concentrations in excess of the limits specified in table I of appendix A in Rules 261 to 270, upon receipt of an application demonstrating that the individual will wear appropriate protective equipment and that the individual will not inhale, ingest, or absorb quantities of radioactive material in excess of those which might otherwise be permitted under this part for individuals in restricted areas during a 40-hour week. An application submitted pursuant to this subrule shall contain all of the following information:

(a) A description of the protective equipment to be employed, including the efficiency of the equipment for the material involved.

(b) Procedures for the fitting, maintenance, and cleaning of the protective equipment.

(c) Procedures governing the use of the protective equipment, including supervisory procedures and length of the time the equipment will be used by the individuals in each work week. The proposed periods for use of the equipment by any individual should not be of such duration as would discourage observance by the individual of the proposed procedures.

(d) The average concentrations present in the areas occupied by individuals.

(e) Procedures for bio-assay evaluation of the effectiveness of the proposed protective safeguards.

R 325.5210 Exposure of minors.

Rule 210. (1) A licensee or registrant shall not receive, acquire, possess, use, or transfer sources of radiation in 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 mrems 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) of this rule.

R 325.5211 Radiation levels from external sources in unrestricted areas.
Rule 211. (1) Except as authorized by the department pursuant to subrule (2) of this rule, 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 the following:
(a) Two millirems in any 1 hour.
(b) One hundred millirems in any 7 consecutive days.
(c) Five hundred millirems in any 1 year.
(2) A person may apply to the department for proposed limits upon levels of radiation in unrestricted areas in excess of those specified in subrule (1) of this rule resulting from the applicants possession or use of sources of radiation. The application shall include information as to anticipated average radiation levels and anticipated occupancy times for each unrestricted area involved. The department shall approve the proposed limits if the applicant demonstrates to the satisfaction of the department that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of 1 calendar year in excess of 0.5 rem.

R 325.5212 Concentrations in effluents to unrestricted areas.
Rule 212. (1) A licensee shall not receive, acquire, possess, use, or transfer licensed material so as to release to an unrestricted area radioactive material in concentrations that exceed the limits specified in table II of appendix A in Rules 261 to 270, except as authorized pursuant to subrule (2) of this rule or Rule 238. For purposes of this rule, concentrations may be averaged over a period not greater than 1 year.
(2) An application for a license or amendment may include proposed limits higher than those specified in subrule (1) of this rule. The department shall approve the proposed limits if the applicant demonstrates both of the following:
(a) The applicant has made a reasonable effort to minimize the radioactivity contained in effluents to unrestricted areas.
(b) It is not likely that radioactive material discharged in the effluent would result in the exposure of an individual to concentrations of radioactive material in air or water exceeding the limits specified in table II of appendix A in Rules 261 to 270.
(3) An application for higher limits pursuant to subrule (2) of this rule shall include information demonstrating that the applicant has made a reasonable effort to minimize the radioactivity discharged in effluents to unrestricted areas, and shall include, as pertinent, the following:
(a) Information as to flow rates, total volume of effluent, peak concentration of each radionuclide in the effluent, and concentration of each radionuclide in the effluent averaged over a period of 1 year at the point where the effluent leaves a stack, tube, pipe, or similar conduit.
(b) A description of the properties of the effluents, including the following:
(i) Chemical composition.
(ii) Physical characteristics, including suspended solids content in liquid effluents, and nature of gas or aerosol for air effluents.
(iii) The hydrogen ion concentrations (pH) of liquid effluents.

(iv) The size range of particulates in effluents released into air.
(c) A description of the anticipated human occupancy in the unrestricted areas where the highest concentration of radioactive material from the effluent is expected, and, in the case of a river or stream, a description of water uses downstream from the point of release of the effluent.
(d) Information as to the highest concentration of each radionuclide in an unrestricted area, including anticipated concentrations averaged over a period of 1 year in the following:
(i) In air at any point of human occupancy.
(ii) In water at points of use downstream from the point of release of the effluent.
(e) The background concentration of radionuclides in the receiving river or stream before the release of liquid effluent.
(f) A description of the environmental monitoring equipment, including sensitivity of the system, and procedures and calculations to determine concentration of radionuclides in the unrestricted area and possible reconcentrating of radionuclides.
(g) A description of the waste treatment facilities and procedures used to reduce the concentration of radionuclides in effluents before their release.
(4) For the purposes of this rule, the concentration limits in table II of appendix A in Rules 261 to 270 apply at the boundary of the restricted area. The concentration of radioactive material discharged through a stack, pipe, or similar conduit may be determined with respect to the point where the material leaves the conduit. If the conduit discharges within the restricted area, the concentration at the boundary may be determined by applying appropriate factors for dilution, dispersion, or decay between the point of discharge and the boundary.
(5) In addition to limiting concentrations in effluent streams, the department may limit quantities of radioactive materials released in air or water during a specified period of time if it appears that the daily intake of radioactive material from air, water, and food by a suitable sample of an exposed population group, averaged over a period not exceeding 1 year, would otherwise exceed the daily intake resulting from continuous exposure to air or water containing 1/3 the concentration of radioactive materials specified in table II of appendix A in Rules 261 to 270.
(6) This rule does not apply to disposal of radioactive material into sanitary sewerage systems, which is governed by Rule 239.

NOTICES, INSTRUCTIONS, AND REPORTS TO WORKERS; INSPECTIONS

R 325.5213 General information.

Rule 213. Rules 214 to 220 apply to the following:
(a) Establish requirements for notices, instructions and reports by licensees or registrants to individuals engaged in work under a license or registration.
(b) Explain options available to individuals in connection with department investigations of licensees or registrants to ascertain compliance with the act, these rules or orders, licenses or registration certificates issued regarding radiological working conditions. Department investigations include investigations of complaints and routine inspections or compliance investigations.
(c) Apply to all persons who own, receive, acquire, possess, use, or transfer sources licensed by or registered with the department pursuant to part 2.

R 325.5214 Posting of notices to workers.

Rule 214. (1) A licensee or registrant shall post current copies of the following documents:

(a) The regulations in this part.
(b) The license, certificate of registration and conditions or documents incorporated by reference and amendments thereto.
(c) The operating procedures applicable to work under the license or registration.
(d) Any notice of violation involving radiological working conditions, proposed imposition of civil penalty, or order issued pursuant to part 1, and any response from the licensee or registrant.
(2) If posting of a document specified in subrule (1)(a), (b) or (c) of this rule is not practicable, the licensee or registrant may post a notice which describes the document and states where it may be examined.
(3) Form RH-100 "Notice to Employees" shall be posted by each licensee or registrant wherever individuals work in or frequent any portion of a restricted area.
(4) Documents, notices, or forms posted pursuant to this rule shall appear in a sufficient number of places to permit individuals 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, shall be conspicuous, and shall be replaced if defaced or altered.
(5) Department documents posted pursuant to subrule(1)(d) of this rule shall be posted within 2 working days after receipt of the documents from the department. The licensee's or registrant's response, if any, shall be posted within 2 working days after dispatch from the licensee or registrant. The documents shall remain posted for a minimum of 5 working days or until action correcting the violation has been completed, whichever is later.

R 325.5215 Instructions to workers.
Rule 215. (1) A licensee or registrant shall do the following:
(a) Inform individuals working in or frequenting any portion of a restricted area of the occurrence of radiation or sources of radiation in those portions of the restricted area.
(b) Instruct workers in the following:
(i) The health protection problems associated with exposure to the sources of radiation and in precautions or procedures to minimize exposure.
(ii) The purposes and functions of protective devices employed.
(iii) Appropriate responses to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material.
(c) Instruct workers to observe, to the extent within the workers' control, the applicable rules and license or registration conditions for the protection of personnel from exposures to radiation or radioactive material.
(d) Advise workers of reports of radiation dose that they may request pursuant to Rule 216.
(e) Inform workers of their responsibility to report promptly to licensee or registrant any condition which may lead to or cause the following:
(i) A violation of department rules, licenses, or registration certificates.
(ii) Unnecessary exposure to radiation or radioactive material.
(2) The extent of instructions required by this rule shall be commensurate with potential radiological health protection problems in the restricted area.

R 325.5216 Notifications and reports to individuals.
Rule 216. (1) Radiation exposure data for an individual and the results of any measurements, analyses, and calculations of radioactive material deposited or retained in the body of an individual shall be reported to the individual as specified in this rule. The information reported shall include data and results obtained pursuant to rules or orders, or license or registration

conditions, as shown in records maintained by the licensee or registrant pursuant to rules. Each notification and report shall meet the following requirements:
(a) Be in writing.
(b) Include appropriate identifying data such as the name of the licensee or registrant, the name of the individual, and the individual's social security number.
(c) Include the individual's exposure information.
(d) Contain the following statement:
"This report is furnished to you under the provisions of Part 5 of the Michigan Department of Environmental Quality rules entitled ‘Standards for Protection Against Radiation’. You should preserve this report for future reference."
(2) At the request of any worker, employed by or associated with him or her, a licensee or registrant shall advise the worker annually of the worker's exposure to radiation or radioactive material as shown in records maintained by the licensee or registrant pursuant to Rule 245.
(3) At the request of a worker formerly engaged in work controlled by the licensee or the registrant, a licensee or registrant shall furnish to the worker a report of the worker's exposure to radiation or radioactive material. The report shall meet the following requirements:
(a) Be furnished within 30 days from the time the request is made, or within 30 days after the exposure of the individual has been determined by the licensee or registrant, whichever is later.
(b) Cover, within the period of time specified in the request, each calendar quarter in which the worker's activities involved exposure to radiation from radioactive material licensed by, or registered with, the department.
(c) Include the dates and locations of work under the license or registration certificate in which the worker participated during this period.
(4) When a licensee or registrant is required pursuant to Rule 250 to report to the department any exposure of an individual to radiation or radioactive material, the licensee or the registrant shall also provide the individual a report on his or her exposure data included therein. Reports shall be transmitted at a time not later than the transmittal to the department.

R 325.5217 Presence of representatives of licensees or registrants and workers during investigations.
Rule 217. (1) A licensee or registrant shall afford opportunity to a department representative, at all reasonable times, to inspect or investigate materials, machines, activities, facilities, premises, and records pursuant to these rules.
(2) A licensee or registrant, or his or her authorized representative, may accompany a department representative during all phases of an investigation except during consultation with workers as specified in Rule 218.
(3) If, at the time of investigation, an individual has been authorized by the workers to represent them during department investigations, the licensee or registrant shall notify the department representative of such authorization and shall give the workers' representative an opportunity to accompany the department representative during the investigation of physical working conditions.
(4) Each worker’s representative shall be routinely engaged in work under control of the licensee or registrant and shall have received instructions as specified in Rule 215.
(5) Different representatives of licensees or registrants and workers may accompany the department representative during different phases of an investigation if there is no resulting interference with the conduct of the investigation. However, only 1 workers' representative at a time may accompany the department representative.

(6) With the approval of the licensee or registrant and the worker's representative, an individual 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, shall be afforded the opportunity to accompany the department representative during the investigation of physical working conditions.

(7) Notwithstanding the other provisions of this rule, a department representative may refuse to permit accompaniment by any individual who deliberately interferes with a fair and orderly investigation. With regard to any area containing proprietary information, the workers' representative for that area shall be an individual previously authorized by the licensee or registrant to enter that area.

R 325.5218 Consultation with workers during investigations.

Rule 218. (1) A department representative may consult privately with workers concerning matters of occupational radiation protection and other matters related to applicable provisions of rules and licenses to the extent the department representative deems necessary for the conduct of an effective and thorough investigation.

(2) During an investigation, a worker or authorized representative may bring privately to the attention of the department representative, either orally or in writing, any past or present condition that he or she has reason to believe may have contributed to or caused the following:

(a) A violation of the act, these rules or license or registration conditions.

(b) An unnecessary exposure of an individual to radiation from radioactive material under the licensee's or registrant's control.

(3) A written notice presented pursuant to subrule (2) of this rule shall comply with requirements of Rule 219(1).

(4) The provisions of subrule (2) of this rule shall not be interpreted as authorization to disregard instructions provided pursuant to Rule 215.

R 325.5219 Requests by workers for investigations.

Rule 219. (1) A worker or representative of workers who believes that a violation of the act, these rules, or license or registration conditions exists or has occurred in work under a license or registration with regard to radiological working conditions in which the worker is engaged, may request an investigation by giving notice of the alleged violation to the department. Any notice shall be in writing, shall set forth the specific grounds for the notice, and shall be signed by the worker or representative of the workers. A copy shall be provided to the licensee or registrant by the department no later than at the time of investigation except that, upon the request of the worker giving notice, his or her name and the name of individuals referred to therein shall not appear in such copy or on any record published, released, or made available by the department, except for good cause shown.

(2) If, upon receipt of notice, the department determines that the complaint meets the requirements in subrule (1) of this rule and that there are reasonable grounds to believe that the alleged violations exists or has occurred, the department shall investigate as soon as practicable, to determine if such alleged violation exists or has occurred. An investigation pursuant to this rule need not be limited to matters referred to in the complaint.

(3) A licensee or registrant shall not discharge or in any manner discriminate against a worker because a worker has filed a complaint or instituted or caused to be instituted any proceeding under these rules or has testified, or is about to testify, in any proceeding or because of the exercise by a worker on behalf of himself or herself or others of any option afforded by this part.

R 325.5220 Investigation not warranted; informal review.

Rule 220. (1) If the department determines, with respect to a complaint under Rule 219, that an investigation is not warranted because there are no reasonable grounds to believe that a violation exists or has occurred, the complainant shall be notified in writing of such determination. The complainant may obtain review of such determination by submitting a written statement of position with the director of the department who shall provide the licensee or registrant with a copy of the statement by registered mail, excluding, at the request of the complainant, the name of the complainant. The licensee or registrant may submit an opposing written statement of position with the director of the department who will provide the complainant with a copy of the statement by registered mail. Upon the request of the complainant, the department may hold an informal conference in which the complainant and the licensee or registrant may orally present his or her views. An informal conference may also be held at the request of the licensee or registrant, but disclosure of the identity of the complainant shall be made only following receipt of written authorization from the complainant. After considering all written or oral views presented, the director of the department, or his or her designated representative, shall affirm, modify, or reverse the determination of the department and furnish the complainant and the licensee or registrant a written notification of his or her decision and the reason.

(2) If the department determines that an investigation is not warranted because the requirements of Rule 219 (1) have not been met, the department shall notify the complainant in writing of the determination. The determination shall be without prejudice to the filing of a new complaint meeting the requirements of Rule 219 (1).

(3) If the decision resulting from informal review is contested, the department shall proceed pursuant to Rule 2 (2).

PRECAUTIONARY PROCEDURES

R 325.5221 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 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.

(2) Each licensee or registrant shall make or cause to be made surveys as may be necessary to establish compliance with these rules.

R 325.5222 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 the following:

(a) Each individual under such circumstances that he or she receives, or is likely to receive, a dose in any calendar quarter in excess of 25% of the quarterly occupational limit specified in Rule 205, (e.g. 300 mrems whole body).

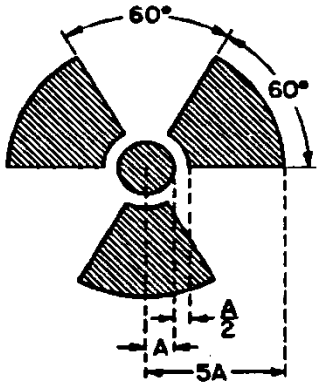
(b) Each individual under 18 years of age under such circumstances that he or she receives, or is likely to receive, a dose in any calendar quarter in excess of 5% of the quarterly occupational limit specified in Rule 205, (e.g. 60 mrems whole body).

(c) Each individual, except a patient being intentionally irradiated, who enters a high radiation area.
(d) Each individual who is likely to receive a dose in excess of 100 millirems in any 5 consecutive days while in a room or area occupied by a patient while the patient is receiving therapy from any gamma-emitting radioactive material.
(e) Each individual for whom personnel monitoring is specifically required under other parts of these rules pertaining to specific uses of sources of radiation.
(2) Monitoring devices used to estimate whole body exposure shall normally be worn on the chest or abdomen. The dosimeter assigned for monitoring the trunk of the body shall not be used for any other purposes. If monitoring of other areas of the body (e.g. lens of the eye, extremity) is required by these rules or requested by the radiation worker because of the nature of exposure, a separate dosimeter shall be assigned for this purpose. The separate dosimeter shall be designated as an auxiliary dosimeter and the radiation record shall specify the specific area monitored.
(3) If auxiliary dosimeters are assigned in accordance with subrule (2) of this rule, the specific body area shall be monitored for a minimum 13 consecutive weeks. If this monitoring results in recorded exposures in excess of 25% of the applicable specified quarterly limit in Rule 205 (e.g. 300 mrems lens of the eye, 6.25 rems hands), the auxiliary dosimeter shall be permanently assigned to monitor that area.

R 325.5224 Caution signs, labels, and signals.
Rule 224. (1) Except as otherwise authorized by the department, symbols prescribed by Rules 224 to 231 shall use the conventional radiation caution colors (magenta or purple on yellow background). The symbol prescribed is the conventional three-bladed design as follows:

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 231, 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.

R 325.5225 Radiation area signs.
Rule 225. Each radiation area shall be conspicuously posted with 1 or more signs bearing the radiation caution symbol and the following words:

CAUTION: RADIATION AREA

R 325.5226 High radiation area signs.
Rule 226. Each high radiation area shall be conspicuously posted with 1or more signs bearing the radiation caution symbol and the following words:

CAUTION: HIGH RADIATION AREA

R 325.5227 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 that complies with 1 of the following:
(a) It causes that level of radiation to be reduced below that at which an individual might receive a dose of 100 millirems 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) Controls shall be established in such a way that an individual will not be prevented from leaving a high radiation area.
(3) The controls required by subrule (1) (a) of this rule shall be constructed in such a manner that the primary radiation cannot be reactivated until all entrances have been secured, and the radiation on-off control is reset at the control panel.
(4) The controls required by subrule (1) (b) of this rule shall be constructed in such a manner that when the warning device is activated, it is necessary to shut off or secure the source of radiation and secure all tripped entrances before being able to inactivate the alarm system.
(5) In the case of a high radiation area established for a period of 30 days or less, direct surveillance to prevent unauthorized entry may be substituted for the controls required by this rule.
(6) A licensee, registrant, or applicant for a license or registration, may apply to the department for approval of methods not included in subrules (1) and (5) of this rule for controlling access to high radiation areas. The department may approve the proposed alternatives if the licensee, registrant, or applicant demonstrates that the alternative methods of control will prevent unauthorized entry into a high radiation area, and that the requirement of subrule (2) of this rule is met.

R 325.5228 Airborne radioactivity area signs.
Rule 228. (1) As used in this rule, “airborne radioactivity area” means a room, enclosure, or operating area in which airborne radioactive material exists in concentrations in excess of the amounts specified in column 1, table I of Rules 261 to 269 or a room, enclosure, or operating area in which airborne radioactive material exists in concentrations which, averaged over the number of hours in any week during which individuals are in the area, exceed 25% of the amounts specified in column 1, table I of Rules 261 to 269.

(2) Each airborne radioactivity area shall be conspicuously posted with 1 or more signs bearing the radiation caution symbol and the following words:

CAUTION
AIRBORNE RADIOACTIVITY AREA

R 325.5229 Area and room signs.

Rule 229. (1) Each area or room in which any radioactive material, other than natural uranium or thorium, is used or stored in an amount exceeding 10 times the quantity of radioactive material specified in Rule 271 shall be conspicuously posted with 1 or more signs bearing the radiation caution symbol and the following words:

CAUTION
RADIOACTIVE MATERIAL

(2) Each area or room in which natural uranium or thorium is used or stored in an amount exceeding 100 times the quantity specified in Rule 271 shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the following words:

CAUTION
RADIOACTIVE MATERIAL

R 325.5230 Container labels.

Rule 230. (1) Except as provided in subrule (3) of this rule each container of radioactive material shall bear a durable, clearly visible label identifying the radioactive contents.

(2) The label required shall bear the radiation caution symbol and the following words:

CAUTION
RADIOACTIVE MATERIAL

It shall also provide sufficient information (including as appropriate, radiation levels, kinds of material, estimate of activity, date for which activity is estimated, and the like) to permit individuals handling or using the containers, or working in their vicinity to take precautions to avoid or minimize being exposed.

(3) Notwithstanding subrule (1) of this rule, labeling is not required for the following:

(a) Containers that do not contain radioactive materials in quantities greater than the applicable quantities listed in Rule 271.

(b) Containers that contain only natural uranium or thorium in quantities no greater than 10 times the applicable quantities listed in Rule 271.

(c) Containers that do not contain radioactive materials in concentrations greater than the applicable concentrations listed in column 2, table I, of appendix A in Rules 261 to 269.
(d) Containers that are attended by an individual who takes the precautions necessary to prevent any individual from being exposed to radiation or radioactive materials in excess of the limits established by this part.
(e) Containers that are in transport and packaged and labeled in accordance with regulations published by the United States Department of Transportation.
(f) Containers that are accessible only to individuals authorized to handle or use them (for example, containers in locations such as water-filled canals, storage vaults, or hot cells) or to work in the vicinity thereof, if the contents are identified to such individuals by a readily available written record.
(g) Manufacturing and process equipment such as nuclear reactors, reactor components piping**,** and tanks.

R 325.5231 Alternate wording for warning signs.
Rule 231. The word DANGER may be used instead of CAUTION in a warning sign required by Rules 225, 226, 228, 229, and 230.

R 325.5232 Rescinded.

R 325.5233 Exemptions from posting and labeling requirements.
Rule 233. Notwithstanding Rules 225 to 230, the following apply:
(a) A room or other area containing radioactive material for periods of less than 8 hours is not required to be posted with a caution sign if either of the following apply:
(i) The material is constantly attended during these periods by an individual who shall take the precautions necessary to prevent any individual from being exposed to radiation or radioactive material in excess of the limits established in this part.
(ii) The room or area is subject to the licensee's or registrant's control.
(b) A room or other area is not required to be posted with a caution sign, and control is not required for each entrance or access point to a room or other area that is a high radiation area, solely because of the presence of radioactive material prepared for transport and packaged and labeled in accordance with regulations of the United States Department of Transportation.

R 325.5236 Storage of sources and procedures for receiving and opening of packages.
Rule 236. (1) Sources of radiation shall be secured against unauthorized removal from the place of storage.
(2) A licensee shall establish and maintain procedures for safely opening packages in which licensed material is received, and the licensee shall assure that such procedures are followed and due consideration is given to special instructions for the type of package being opened.

R 325.5237 Surface contamination.
Rule 237. (1) Pursuant to Rule 221, a licensee or registrant shall conduct surveys and measurements of radioactive surface contamination of facilities, equipment, and other property that may be contaminated. With regard to radioactive surface contamination, the philosophy and goal stated in Rule 201(2) may be considered presently satisfied by following the guidance in Rule 272.

(2) A facility, installation, equipment, or other property shall not be assigned, sold, leased, or transferred to an unlicensed person unless the property has been decontaminated below the applicable limits specified in Rule 272.
(3) The guidance in Rule 272 may be modified at the discretion of the department in any specific situation involving a specific radionuclide.

R 325.5238 Disposal of radioactive material.
Rule 238. (1) A licensee shall not dispose of any radioactive material except for either of the following:
(a) By transfer to an authorized recipient as provided in Rule 123.
(b) As authorized pursuant to subrule (2) of this rule or Rule 212, 239, or 240.
(2) A person may apply to the department for approval of proposed procedures to dispose of radioactive material in a manner not otherwise authorized in this part. The application shall include a description of the radioactive material, including the quantities and kinds of radioactive material and the levels of radioactivity involved, and the proposed manner and conditions of disposal. The application, where appropriate, should also include an analysis and evaluation of pertinent information as to the nature of the environment, including topographical, geological, meteorological, and hydrological characteristics; usage of ground and surface waters in the general area; the nature and location of other potentially affected facilities; and procedures to be observed to minimize the risk of unexpected or hazardous exposures.
(3) The department shall not approve an application for a license to receive radioactive material from other persons for disposal on land not owned by a state or the federal government.

R 325.5239 Disposal by release into sanitary sewerage systems.
Rule 239. (1) A licensee shall not discharge radioactive material into a sanitary sewerage system unless all of the following conditions exist:
(a) It is readily soluble or dispersible in water.
(b) The quantity of any radioactive material released into the system by the licensee in any 1 day does not exceed the larger of the following:
(i) The quantity which, if diluted by the average daily quantity of sewage released into the sewer by the licensee, will result in an average concentration not greater than the limits specified in column 2, table I, of Rules 261 to 269.
(ii) Ten times the quantity of such material specified in Rule 271.
(c) The quantity of any radioactive material released in any 1 month, if diluted by the average monthly quantity of water released by the licensee, will not result in an average concentration exceeding the limits specified in column 2, table I, of Rules 261 to 269.
(d) The gross quantity of radioactive material released into the sewerage system by the licensee does not exceed 1 curie per year.
(2) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material shall be exempt from any limitations contained in this rule.

R 325.5240 Disposal by burial in soil or incineration.
Rule 240. (1) Burial sites shall be licensed by the department upon application submitted in accordance with Rules 101 and 102. Burial shall be in a controlled area.
(2) A licensee shall not incinerate radioactive material for the purpose of disposal or preparation for disposal except as specifically approved by the department pursuant to Rules 212 and 238.

R 325.5241 Use of safety equipment.
Rule 241. (1) Requirements for safety interlocks, protective enclosures, protective clothing, precautionary labels, or any other safety equipment presumes the proper use of such equipment. Unauthorized override of safety interlocks or other intentional misuse or non-use of required safety equipment shall be considered willful violation of these rules.
(2) The radiation supervisor shall request, in writing, from the department, authorization to override safety interlocks. The request shall include justification, precautionary procedures during override, and statement of immediate supervision by the radiation protection supervisor or his or her authorized representative. Prior approval by the department is required. Approval may be granted by written condition on the specific license or registration certificate or by telephone followed by written confirmation from the department.

RECORDS, REPORTS AND NOTIFICATION

R 325.5245 Records of surveys, radiation monitoring, disposal, and tests.
Rules 245. (1) A licensee or registrant shall maintain records showing the radiation doses of all individuals for whom personnel monitoring is required under Rule 222. Records shall be kept on department Form RH-102, in accordance with the instructions contained in that form, or on clear and legible records containing all the information required by Form RH-102. The doses entered on the forms or records shall be for periods of time not exceeding 1 calendar quarter.
(2) A licensee or registrant shall maintain records in the same units used in this part, showing the results of surveys required in Rule 221, disposals made under Rules 238 to 240, and surveys required by other parts of these rules.
(3) Records of individual exposure to radiation and to radioactive material that is maintained pursuant to subrule (1) of this rule and records of bio-assays, including results of whole body counting examinations, made pursuant to Rule 209 shall be preserved indefinitely or until the department authorizes their disposal.
(4) The discontinuance or curtailment of activities does not relieve the licensee or registrant of responsibility for retaining all records required by this rule. A licensee or registrant may, however, request the department to accept such records. The acceptance of the records by the department relieves the licensee or registrant of subsequent responsibility only in respect to its preservation as required by this rule.
(5) Records that are maintained pursuant to this part may be maintained in the form of microfilms.

R 325.5246 Reports of theft or loss of sources of radiation.
Rule 246. A licensee or registrant shall report by telephone and facsimile to the department the theft or loss of any source of radiation immediately after such occurrence becomes known to the licensee or registrant.

R 325.5247 Notification of incidents.
Rule 247. (1) A licensee or registrant shall immediately notify the department by telephone and facsimile if any incident involving any source of radiation possessed by him or her and that may have caused or threatens to cause any of the following:

(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 $100,000.00.
(2) A licensee or registrant shall within 24 hours notify the department by telephone and facsimile of any incident involving any source of radiation possessed by him or her and that may have caused or threatens to cause any of the following:
(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 that, 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 $1,000.00 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 are stated in a separate part of the report.

R 325.5250 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 all of the following 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) of this rule 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) of this rule; levels of radiation and concentrations of radioactive material involved; the cause of exposure, levels, or concentrations; and corrective steps taken or planned to assure against a recurrence.
(3) A report filed with the department pursuant to subrule (1) of this rule shall include for each individual exposed the name, social security number, and date of birth, and an estimate of the individual's dose. The report shall be prepared so that this information is stated in a separate part of the report.

R 325.5253 Vacating premises.
Rule 253. A specific licensee, not less than 20 days before vacating or relinquishing possession or control of premises that may have been contaminated with radioactive material as a result of his or her activities, shall notify the department in writing of intent to vacate. When deemed

necessary by the department, the licensee shall decontaminate or have decontaminated the premises in a manner required by the department.

TRANSPORTATION

R 325.5255 Intrastate transportation of radioactive materials.

Rule 255. (1) A licensee shall not transport any radioactive material outside of the confines of his or her plant or other authorized location of use, or deliver any radioactive material to a carrier for transportation, unless the licensee complies with 10 CFR Parts 20, 71; 14 CFR Part 103; 46 CFR Part 146; and 49 CFR Parts 173-179 to the same extent as if the transportation were subject to the rules and regulations of that agency.

(2) This rule applies to both of the following:

(a) The transportation of radioactive material.

(b) The delivery of radioactive material to a carrier for transportation that is not subject to the rules and regulations of the United States Department of Transportation and other agencies of the United States.

R 325.5256 Rescinded.

R 325.5261 Appendix A1. Concentrations in air and water above natural background. Elements A and B.

Rule 261. (See notes in Rule 270.)

			TABLE I		TABLE II	
Element (atomic number)	Radionuclide*		Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)	Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)
Actinium (89)	Ac-227	S	2×10^{-12}	6×10^{-5}	8×10^{-14}	2×10^{-6}
		I	3×10^{-11}	9×10^{-3}	9×10^{-13}	3×10^{-4}
	Ac-228	S	8×10^{-8}	3×10^{-3}	3×10^{-9}	9×10^{-5}
		I	2×10^{-8}	3×10^{-3}	6×10^{-10}	9×10^{-5}
Americium (95)	Am-241	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Am-242m	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	3×10^{-10}	3×10^{-3}	9×10^{-12}	9×10^{-5}
	Am-242	S	4×10^{-8}	4×10^{-3}	1×10^{-9}	1×10^{-4}
		I	5×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
	Am-243	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Am-244	S	4×10^{-6}	1×10^{-1}	1×10^{-7}	5×10^{-3}
		I	2×10^{-5}	1×10^{-1}	8×10^{-7}	5×10^{-3}
Antimony (51)	Sb-122	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
	Sb-124	S	2×10^{-7}	7×10^{-4}	5×10^{-9}	2×10^{-5}
		I	2×10^{-8}	7×10^{-4}	7×10^{-10}	2×10^{-5}
	Sb-125	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	3×10^{-8}	3×10^{-3}	9×10^{-10}	1×10^{-4}

Argon (18)	A-37	Sub**	6×10^{-3}	----------	1×10^{-4}	----------
	A-41	Sub	2×10^{-6}	----------	4×10^{-8}	----------
Arsenic (33)	As-73	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	5×10^{-4}
		I	4×10^{-7}	1×10^{-2}	1×10^{-8}	5×10^{-4}
	As-74	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	5×10^{-5}
		I	1×10^{-7}	2×10^{-3}	4×10^{-9}	5×10^{-5}
	As-76	S	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
		I	1×10^{-7}	6×10^{-4}	3×10^{-9}	2×10^{-5}
	As-77	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Astatine (85)	At-211	S	7×10^{-9}	5×10^{-5}	2×10^{-10}	2×10^{-6}
		I	3×10^{-8}	2×10^{-3}	1×10^{-9}	7×10^{-5}
Barium (56)	Ba-131	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Ba-140	S	1×10^{-7}	8×10^{-4}	4×10^{-9}	3×10^{-5}
		I	4×10^{-8}	7×10^{-4}	1×10^{-9}	2×10^{-5}
Berkelium (97)	Bk-249	S	9×10^{-10}	2×10^{-2}	3×10^{-11}	6×10^{-4}
		I	1×10^{-7}	2×10^{-2}	4×10^{-9}	6×10^{-4}
	Bk-250	S	1×10^{-7}	6×10^{-3}	5×10^{-9}	2×10^{-4}
		I	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
Beryllium (4)	Be-7	S	6×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
		I	1×10^{-6}	5×10^{-2}	4×10^{-8}	2×10^{-3}
Bismuth (83)	Bi-206	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
		I	1×10^{-7}	1×10^{-3}	5×10^{-9}	4×10^{-5}
	Bi-207	S	2×10^{-7}	2×10^{-3}	6×10^{-9}	6×10^{-5}
		I	1×10^{-8}	2×10^{-3}	5×10^{-10}	6×10^{-5}
	Bi-210	S	6×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
		I	6×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
	Bi-212	S	1×10^{-7}	1×10^{-2}	3×10^{-9}	4×10^{-4}
		I	2×10^{-7}	1×10^{-2}	7×10^{-9}	4×10^{-4}
Bromine (35)	Br-82	S	1×10^{-6}	8×10^{-3}	4×10^{-8}	3×10^{-4}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}

R 325.5262 Appendix A2. Concentrations in air and water above natural background. Elements C.

Rule 262. (See notes in Rule 270.)

			TABLE I		TABLE II	
Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Cadmium (48)	Cd-109	S	5×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
		I	7×10^{-8}	5×10^{-3}	3×10^{-9}	2×10^{-4}
	Cd-115m	S	4×10^{-8}	7×10^{-4}	1×10^{-9}	3×10^{-5}

		I	4×10^{-8}	7×10^{-4}	1×10^{-9}	3×10^{-5}
	Cd-115	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{5}
		I	2×10^{-7}	1×10^{-3}	6×10^{9}	4×10^{-5}
Calcium (20)	Ca-45	S	3×10^{-8}	3×10^{-4}	1×10^{-9}	9×10^{-6}
		I	1×10^{-7}	5×10^{-3}	4×10^{-9}	2×10^{-4}
	Ca-47	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	3×10^{-5}
Californium (98)	Cf-249	S	2×10^{-12}	1×10^{-4}	5×10^{-14}	4×10^{-6}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	2×10^{-5}
	Cf-250	S	5×10^{-12}	4×10^{-4}	2×10^{-13}	1×10^{-5}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	3×10^{-5}
	Cf-251	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
	Cf-252	S	6×10^{-12}	2×10^{-4}	2×10^{-13}	7×10^{-6}
		I	3×10^{-11}	2×10^{-4}	1×10^{-12}	7×10^{-6}
	Cf-253	S	8×10^{-10}	4×10^{-3}	3×10^{-11}	1×10^{-4}
		I	8×10^{-10}	4×10^{-3}	3×10^{-11}	1×10^{-4}
	Cf-254	S	5×10^{-12}	4×10^{-6}	2×10^{-13}	1×10^{-7}
		I	5×10^{-12}	4×10^{-6}	2×10^{-13}	1×10^{-7}
Carbon (6)	C-14	S	4×10^{-6}	2×10^{-2}	1×10^{-7}	8×10^{-4}
	(CO_2)	Sub**	5×10^{-5}	----------	1×10^{-6}	----------
Cerium (58)	Ce-141	S	4×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	2×10^{-7}	3×10^{-3}	5×10^{-9}	9×10^{-5}
	Ce-143	S	3×10^{-7}	1×10^{-3}	9×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
	Ce-144	S	1×10^{-8}	3×10^{-4}	3×10^{-10}	1×10^{-5}
		I	6×10^{-9}	3×10^{-4}	2×10^{-10}	1×10^{-5}
Cesium (55)	Cs-131	S	1×10^{-5}	7×10^{-2}	4×10^{-7}	2×10^{-3}
		I	3×10^{-6}	3×10^{-2}	1×10^{-7}	9×10^{-4}
	Cs-134m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	6×10^{-3}
		I	6×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
	Cs-134	S	4×10^{-8}	3×10^{-4}	1×10^{-9}	9×10^{-6}
		I	1×10^{-8}	1×10^{-3}	4×10^{-10}	4×10^{-5}
	Cs-135	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	9×10^{-8}	7×10^{-3}	3×10^{-9}	2×10^{-4}
	Cs-136	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	9×10^{-5}
		I	2×10^{-7}	2×10^{-3}	6×10^{-9}	6×10^{-5}
	Cs-137	S	6×10^{-8}	4×10^{-4}	2×10^{-9}	2×10^{-5}
		I	1×10^{-8}	1×10^{-3}	5×10^{-10}	4×10^{-5}
Chlorine (17)	Cl-36	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
		I	2×10^{-8}	2×10^{-3}	8×10^{-10}	6×10^{-5}
	Cl-38	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	7×10^{-8}	4×10^{-4}
Chromium (24)	Cr-51	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	2×10^{-6}	5×10^{-2}	8×10^{-8}	2×10^{-3}
Cobalt (27)	Co-57	S	3×10^{-6}	2×10^{-2}	1×10^{-7}	5×10^{-4}
		I	2×10^{-7}	1×10^{-2}	6×10^{-9}	4×10^{-4}

	Co-58m	S	2×10^{-5}	8×10^{-2}	6×10^{-7}	3×10^{-3}
		I	9×10^{-6}	6×10^{-2}	3×10^{-7}	2×10^{-3}
	Co-58	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-8}	3×10^{-3}	2×10^{-9}	9×10^{-5}
	Co-60	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	5×10^{-5}
		I	9×10^{-9}	1×10^{-3}	3×10^{-10}	3×10^{-5}
Copper (29)	Cu-64	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	3×10^{-4}
		I	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
Curium (96)	Cm-242	S	1×10^{-10}	7×10^{-4}	4×10^{-12}	2×10^{-5}
		I	2×10^{-10}	7×10^{-4}	6×10^{-12}	2×10^{-5}
	Cm-243	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	5×10^{-6}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	2×10^{-5}
	Cm-244	S	9×10^{-12}	2×10^{-4}	3×10^{-13}	7×10^{-6}
		I	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
	Cm-245	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Cm-246	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Cm-247	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	6×10^{-4}	4×10^{-12}	2×10^{-5}
	Cm-248	S	6×10^{-13}	1×10^{-5}	2×10^{-14}	4×10^{-7}
		I	1×10^{-11}	4×10^{-5}	4×10^{-13}	1×10^{-6}
	Cm-249	S	1×10^{-5}	6×10^{-2}	4×10^{-7}	2×10^{-3}
		I	1×10^{-5}	6×10^{-2}	4×10^{-7}	2×10^{-3}

R 325.5263 Appendix A3. Concentrations in air and water above natural background. Elements D to H.

Rules 263. (See notes in Rule 270.)

			TABLE I		TABLE II	
Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Dysprosium (66)	Dy-165	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	7×10^{-8}	4×10^{-4}
	Dy-166	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
Einsteinium (99)	Es-253	S	8×10^{-10}	7×10^{-4}	3×10^{-11}	2×10^{-5}
		I	6×10^{-10}	7×10^{-4}	2×10^{-11}	2×10^{-5}
	Es-254m	S	5×10^{-9}	5×10^{-4}	2×10^{-10}	2×10^{-5}
		I	6×10^{-9}	5×10^{-4}	2×10^{-10}	2×10^{-5}
	Es-254	S	2×10^{-11}	4×10^{-4}	6×10^{-13}	1×10^{-5}
		I	1×10^{-10}	4×10^{-4}	4×10^{-12}	1×10^{-5}
	Es-255	S	5×10^{-10}	8×10^{-4}	2×10^{-11}	3×10^{-5}
		I	4×10^{-10}	8×10^{-4}	1×10^{-11}	3×10^{-5}
Erbium (68)	Er-169	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	4×10^{-7}	3×10^{-3}	1×10^{-8}	9×10^{-5}
	Er-171	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}

		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Europium (63)	Eu-152 ($T_{1/2}$=9.2 hrs)	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Eu-152 ($T_{1/2}$=13 yrs)	S	1×10^{-8}	2×10^{-3}	4×10^{-10}	8×10^{-5}
		I	2×10^{-8}	2×10^{-3}	6×10^{-10}	8×10^{-5}
	Eu-154	S	4×10^{-9}	6×10^{-4}	1×10^{-10}	2×10^{-5}
		I	7×10^{-9}	6×10^{-4}	2×10^{-10}	2×10^{-5}
	Eu-155	S	9×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
		I	7×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
Fermium (100)	Fm-254	S	6×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
		I	7×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
	Fm-255	S	2×10^{-8}	1×10^{-3}	6×10^{-10}	3×10^{-5}
		I	1×10^{-8}	1×10^{-3}	4×10^{-10}	3×10^{-5}
	Fm-256	S	3×10^{-9}	3×10^{-5}	1×10^{-10}	9×10^{-7}
		I	2×10^{-9}	3×10^{-5}	6×10^{-11}	9×10^{-7}
Fluorine (9)	F-18	S	5×10^{-6}	2×10^{-2}	2×10^{-7}	8×10^{-4}
		I	3×10^{-6}	1×10^{-2}	9×10^{-8}	5×10^{-4}
Gadolinium (64)	Gd-153	S	2×10^{-7}	6×10^{-3}	8×10^{-9}	2×10^{-4}
		I	9×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
	Gd-159	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Gallium (31)	Ga-72	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
Germanium (32)	Ge-71	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	6×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
Gold (79)	Au-196	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	6×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
	Au-198	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}
	Au-199	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	8×10^{-7}	4×10^{-3}	3×10^{-8}	2×10^{-4}
Hafnium (72)	Hf-181	S	4×10^{-8}	2×10^{-3}	1×10^{-9}	7×10^{-5}
		I	7×10^{-8}	2×10^{-3}	3×10^{-9}	7×10^{-5}
Holmium (67)	Ho-166	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
Hydrogen (1)	H-3	S	5×10^{-6}	1×10^{-1}	2×10^{-7}	3×10^{-3}
		I	5×10^{-6}	1×10^{-1}	2×10^{-7}	3×10^{-3}
		Sub**	2×10^{-3}	----------	4×10^{-5}	----------

R 325.5264 Appendix A4. Concentrations in air and water above natural background. Elements I to L.

Rule 264. (See notes in Rule 270.)

	TABLE I	TABLE II

Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Indium (49)	In-113m	S	8×10^{-6}	4×10^{-2}	3×10^{-7}	1×10^{-3}
		I	7×10^{-6}	4×10^{-2}	2×10^{-7}	1×10^{-3}
	In-114m	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	2×10^{-8}	5×10^{-4}	7×10^{-10}	2×10^{-5}
	In-115m	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	4×10^{-4}
	In-115	S	2×10^{-7}	3×10^{-3}	9×10^{-9}	9×10^{-5}
		I	3×10^{-8}	3×10^{-3}	1×10^{-9}	9×10^{-5}
Iodine (53)	I-125	S	5×10^{-9}	4×10^{-5}	8×10^{-11}	2×10^{-7}
		I	2×10^{-7}	6×10^{-3}	6×10^{-9}	2×10^{-4}
	I-126	S	8×10^{-9}	5×10^{-5}	9×10^{-11}	3×10^{-7}
		I	3×10^{-7}	3×10^{-3}	1×10^{-8}	9×10^{-5}
	I-129	S	2×10^{-9}	1×10^{-5}	2×10^{-11}	6×10^{-8}
		I	7×10^{-8}	6×10^{-3}	2×10^{-9}	2×10^{-4}
	I-131	S	9×10^{-9}	6×10^{-5}	1×10^{-10}	3×10^{-7}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	I-132	S	2×10^{-7}	2×10^{-3}	3×10^{-9}	8×10^{-6}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	I-133	S	3×10^{-8}	2×10^{-4}	4×10^{-10}	1×10^{-6}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
	I-134	S	5×10^{-7}	4×10^{-3}	6×10^{-9}	2×10^{-5}
		I	3×10^{-6}	2×10^{-2}	1×10^{-7}	6×10^{-4}
	I-135	S	1×10^{-7}	7×10^{-4}	1×10^{-9}	4×10^{-6}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
Iridium (77)	Ir-190	S	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Ir-192	S	1×10^{-7}	1×10^{-3}	4×10^{-9}	4×10^{-5}
		I	3×10^{-8}	1×10^{-3}	9×10^{-10}	4×10^{-5}
	Ir-194	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
Iron (26)	Fe-55	S	9×10^{-7}	2×10^{-2}	3×10^{-8}	8×10^{-4}
		I	1×10^{-6}	7×10^{-2}	3×10^{-8}	2×10^{-3}
	Fe-59	S	1×10^{-7}	2×10^{-3}	5×10^{-9}	6×10^{-5}
		I	5×10^{-8}	2×10^{-3}	2×10^{-9}	5×10^{-5}
Krypton (36)	Kr-85m	Sub**	6×10^{-6}	----------	1×10^{-7}	----------
	Kr-85	Sub**	1×10^{-5}	----------	3×10^{-7}	----------
	Kr-87	Sub**	1×10^{-6}	----------	2×10^{-8}	----------
	Kr-88	Sub**	1×10^{-6}	----------	2×10^{-8}	----------
Lanthanum (57)	La-140	S	2×10^{-7}	7×10^{-4}	5×10^{-9}	2×10^{-5}
		I	1×10^{-7}	7×10^{-4}	4×10^{-9}	2×10^{-5}

Lead (82)	Pb-203	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	4×10^{-4}
	Pb-210	S	1×10^{-10}	4×10^{-6}	4×10^{-12}	1×10^{-7}
		I	2×10^{-10}	5×10^{-3}	8×10^{-12}	2×10^{-4}
	Pb-212	S	2×10^{-8}	6×10^{-4}	6×10^{-10}	2×10^{-5}
		I	2×10^{-8}	5×10^{-4}	7×10^{-10}	2×10^{-5}
Lutetium (71)	Lu-177	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}

R 325.5265 Appendix A5. Concentrations in air and water above natural background. Elements M to O.

Rule 265. (See notes in Rule 270.)

			TABLE I		TABLE II	
Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Manganese (25)	Mn-52	S	2×10^{-7}	1×10^{-3}	7×10^{-9}	3×10^{-5}
		I	1×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
	Mn-54	S	4×10^{-7}	4×10^{-3}	1×10^{-8}	1×10^{-4}
		I	4×10^{-8}	3×10^{-3}	1×10^{-9}	1×10^{-4}
	Mn-56	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Mercury (80)	Hg-197m	S	7×10^{-7}	6×10^{-3}	3×10^{-8}	2×10^{-4}
		I	8×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Hg-197	S	1×10^{-6}	9×10^{-3}	4×10^{-8}	3×10^{-4}
		I	3×10^{-6}	1×10^{-2}	9×10^{-8}	5×10^{-4}
	Hg-203	S	7×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
Molybdenum (42)	Mo-99	S	7×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
Neodymium (60)	Nd-144	S	8×10^{-11}	2×10^{-3}	3×10^{-12}	7×10^{-5}
		I	3×10^{-10}	2×10^{-3}	1×10^{-11}	8×10^{-5}
	Nd-147	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	2×10^{-3}	8×10^{-9}	6×10^{-5}
	Nd-149	S	2×10^{-6}	8×10^{-3}	6×10^{-8}	3×10^{-4}
		I	1×10^{-6}	8×10^{-3}	5×10^{-8}	3×10^{-4}
Neptunium (93)	Np-237	S	4×10^{-12}	9×10^{-5}	1×10^{-13}	3×10^{-6}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
	Np-239	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	7×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
Nickel (28)	Ni-59	S	5×10^{-7}	6×10^{-3}	2×10^{-8}	2×10^{-4}
		I	8×10^{-7}	6×10^{-2}	3×10^{-8}	2×10^{-3}
	Ni-63	S	6×10^{-8}	8×10^{-4}	2×10^{-9}	3×10^{-5}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	7×10^{-4}
	Ni-65	S	9×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Niobium (41)	Nb-93m	S	1×10^{-7}	1×10^{-2}	4×10^{-9}	4×10^{-4}

		I	2×10^{-7}	1×10^{-2}	5×10^{-9}	4×10^{-4}
	Nb-95	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	1×10^{-7}	3×10^{-3}	3×10^{-9}	1×10^{-4}
	Nb-97	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
Osmium (76)	Os-185	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	5×10^{-8}	2×10^{-3}	2×10^{-9}	7×10^{-5}
	Os-191m	S	2×10^{-5}	7×10^{-2}	6×10^{-7}	3×10^{-3}
		I	9×10^{-6}	7×10^{-2}	3×10^{-7}	2×10^{-3}
	Os-191	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Os-193	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	3×10^{-7}	2×10^{-3}	9×10^{-9}	5×10^{-5}

R 325.5266 Appendix A6. Concentrations in air and water above natural background. Elements P.

Rule 266. (See notes in Rule 270.)

			TABLE I		TABLE II	
Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Palladium (46)	Pd-103	S	1×10^{-6}	1×10^{-2}	5×10^{-8}	3×10^{-4}
		I	7×10^{-7}	8×10^{-3}	3×10^{-8}	3×10^{-4}
	Pd-109	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
Phosphorus (15)	P-32	S	7×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}
		I	8×10^{-8}	7×10^{-4}	3×10^{-9}	2×10^{-5}
Platinum (78)	Pt-191	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
	Pt-193m	S	7×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
	Pt-193	S	1×10^{-6}	3×10^{-2}	4×10^{-8}	9×10^{-4}
		I	3×10^{-7}	5×10^{-2}	1×10^{-8}	2×10^{-3}
	Pt-197m	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
	Pt-197	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Plutonium (94)	Pu-238	S	2×10^{-12}	1×10^{-4}	7×10^{-14}	5×10^{-6}
		I	3×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu-239	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu-240	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu-241	S	9×10^{-11}	7×10^{-3}	3×10^{-12}	2×10^{-4}
		I	4×10^{-8}	4×10^{-2}	1×10^{-9}	1×10^{-3}
	Pu-242	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	9×10^{-4}	1×10^{-12}	3×10^{-5}

	Pu-243	S	2×10^{-6}	1×10^{-2}	6×10^{-8}	3×10^{-4}
		I	2×10^{-6}	1×10^{-2}	8×10^{-8}	3×10^{-4}
	Pu-244	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	4×10^{-6}
		I	3×10^{-11}	3×10^{-4}	1×10^{-12}	1×10^{-5}
Polonium (84)	Po-210	S	5×10^{-10}	2×10^{-5}	2×10^{-11}	7×10^{-7}
		I	2×10^{10}	8×10^{-4}	7×10^{-12}	3×10^{-5}
Potassium (19)	K-42	S	2×10^{-6}	9×10^{-3}	7×10^{-8}	3×10^{-4}
		I	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
Praseodymium (59)	Pr-142	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
	Pr-143	S	3×10^{-7}	1×10^{3}	1×10^{-8}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	5×10^{-3}
Promethium (61)	Pm-147	S	6×10^{-8}	6×10^{-3}	2×10^{-9}	2×10^{-4}
		I	1×10^{-7}	6×10^{-3}	3×10^{-9}	2×10^{-4}
	Pm-149	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
Protactinium (91)	Pa-230	S	2×10^{-9}	7×10^{-3}	6×10^{-11}	2×10^{-4}
		I	8×10^{-10}	7×10^{-3}	3×10^{-11}	2×10^{-4}
	Pa-231	S	1×10^{-12}	3×10^{-5}	4×10^{-14}	9×10^{-7}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	2×10^{-5}
	Pa-233	S	6×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
		I	2×10^{-7}	3×10^{-3}	6×10^{-9}	1×10^{-4}

R 325.5267 Appendix A7. Concentrations in air and water above natural background. Elements R and S.

Rule 267. (See notes in Rule 270.)

			TABLE I		TABLE II	
Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Radium (88)	Ra-223	S	2×10^{-9}	2×10^{-5}	6×10^{-11}	7×10^{-7}
		I	2×10^{-10}	1×10^{-4}	8×10^{-12}	4×10^{-6}
	Ra-224	S	5×10^{-9}	7×10^{-5}	2×10^{-10}	2×10^{-6}
		I	7×10^{-10}	2×10^{-4}	2×10^{-11}	5×10^{-6}
	Ra-226	S	3×10^{-11}	4×10^{-7}	3×10^{-12}	3×10^{-8}
		I	5×10^{-11}	9×10^{-4}	2×10^{-12}	3×10^{-5}
	Ra-228	S	7×10^{-11}	8×10^{-7}	2×10^{-12}	3×10^{-8}
		I	4×10^{-11}	7×10^{-4}	1×10^{-12}	3×10^{-5}
Radon (86)	Rn-220	S	3×10^{-7}	----------	1×10^{-8}	----------
		I	----------	----------	----------	----------
	Rn-222***	S	1×10^{-6}	----------	3×10^{-9}	----------
Rhenium (75)	Re-183	S	3×10^{-6}	2×10^{-2}	9×10^{-8}	6×10^{-4}
		I	2×10^{-7}	8×10^{-3}	5×10^{-9}	3×10^{-4}
	Re-186	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}

	Re-187	S	9×10^{-6}	7×10^{-2}	3×10^{-7}	3×10^{-3}
		I	5×10^{-7}	4×10^{-2}	2×10^{-8}	2×10^{-3}
	Re-188	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
Rhodium (45)	Rh-103m	S	8×10^{-5}	4×10^{-1}	3×10^{-6}	1×10^{-2}
		I	6×10^{-5}	3×10^{-1}	2×10^{-6}	1×10^{-2}
	Rh-105	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Rubidium (37)	Rb-86	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
		I	7×10^{-8}	7×10^{-4}	2×10^{-9}	2×10^{-5}
	Rb-87	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	7×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
Ruthenium (44)	Ru-97	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	3×10^{-4}
	Ru-103	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	8×10^{-8}	2×10^{-3}	3×10^{-9}	8×10^{-5}
	Ru-105	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
	Ru-106	S	8×10^{-8}	4×10^{-4}	3×10^{-9}	1×10^{-5}
		I	6×10^{-9}	3×10^{-4}	2×10^{-10}	1×10^{-5}
Samarium (62)	Sm-147	S	7×10^{-11}	2×10^{-3}	2×10^{-12}	6×10^{-5}
		I	3×10^{-10}	2×10^{-3}	9×10^{-12}	7×10^{-5}
	Sm-151	S	6×10^{-8}	1×10^{-2}	2×10^{-9}	4×10^{-4}
		I	1×10^{-7}	1×10^{-2}	5×10^{-9}	4×10^{-4}
	Sm-153	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Scandium (21)	Sc-46	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-8}	1×10^{-3}	8×10^{-10}	4×10^{-5}
	Sc-47	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
	Sc-48	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
Selenium (34)	Se-75	S	1×10^{-6}	9×10^{-3}	4×10^{-8}	3×10^{-4}
		I	1×10^{-7}	8×10^{-3}	4×10^{-9}	3×10^{-4}
Silicon (14)	Si-31	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
		I	1×10^{-6}	6×10^{-3}	3×10^{-8}	2×10^{-4}
Silver (47)	Ag-105	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	8×10^{-8}	3×10^{-3}	3×10^{-9}	1×10^{-4}
	Ag-110m	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	1×10^{-8}	9×10^{-4}	3×10^{-10}	3×10^{-5}
	Ag-111	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
Sodium (11)	Na-22	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
		I	9×10^{-9}	9×10^{-4}	3×10^{-10}	3×10^{-5}
	Na-24	S	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}

Strontium (38)	Sr-85m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	7×10^{-3}
		I	3×10^{-5}	2×10^{-1}	1×10^{-6}	7×10^{-3}
	Sr-85	S	2×10^{-7}	3×10^{-3}	8×10^{-9}	1×10^{-4}
		I	1×10^{-7}	5×10^{-3}	4×10^{-9}	2×10^{-4}
	Sr-89	S	3×10^{-8}	3×10^{-4}	3×10^{-10}	3×10^{-6}
		I	4×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
	Sr-90	S	1×10^{-9}	1×10^{-5}	3×10^{-11}	3×10^{-7}
		I	5×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
	Sr-91	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	1×10^{-3}	9×10^{-9}	5×10^{-5}
	Sr-92	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
Sulfur (16)	S-35	S	3×10^{-7}	2×10^{-3}	9×10^{-9}	6×10^{-5}
		I	3×10^{-7}	8×10^{-3}	9×10^{-9}	3×10^{-4}

R 325.5268 Appendix A8. Concentrations in air and water above natural background. Elements T.

Rule 268. (See notes in Rule 270.)

			TABLE I		TABLE II	
Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Tantalum (73)	Ta-182	S	4×10^{-8}	1×10^{-3}	1×10^{-9}	4×10^{-5}
		I	2×10^{-8}	1×10^{-3}	7×10^{-10}	4×10^{-5}
Technetium (43)	Tc-96m	S	8×10^{-5}	4×10^{-1}	3×10^{-6}	1×10^{-2}
		I	3×10^{-5}	3×10^{-1}	1×10^{-6}	1×10^{-2}
	Tc-96	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}
	Tc-97m	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-7}	5×10^{-3}	5×10^{-9}	2×10^{-4}
	Tc-97	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	8×10^{-4}
	Tc-99m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	6×10^{-3}
		I	1×10^{-5}	8×10^{-2}	5×10^{-7}	3×10^{-3}
	Tc-99	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	3×10^{-4}
		I	6×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
Tellurium (52)	Te-125m	S	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
	Te-127m	S	1×10^{-7}	2×10^{-3}	5×10^{-9}	6×10^{-5}
		I	4×10^{-8}	2×10^{-3}	1×10^{-9}	5×10^{-5}
	Te-127	S	2×10^{-6}	8×10^{-3}	6×10^{-8}	3×10^{-4}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Te-129m	S	8×10^{-8}	1×10^{-3}	3×10^{-9}	3×10^{-5}
		I	3×10^{-8}	6×10^{-4}	1×10^{-9}	2×10^{-5}
	Te-129	S	5×10^{-6}	2×10^{-2}	2×10^{-7}	8×10^{-4}
		I	4×10^{-6}	2×10^{-2}	1×10^{-7}	8×10^{-4}

	Te-131m	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
	Te-132	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
Terbium (65)	Tb-160	S	1×10^{-7}	1×10^{-3}	3×10^{-9}	4×10^{-5}
		I	3×10^{-8}	1×10^{-3}	1×10^{-9}	4×10^{-5}
Thallium (81)	Tl-200	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	1×10^{-6}	7×10^{-3}	4×10^{-8}	2×10^{-4}
	Tl-201	S	2×10^{-6}	9×10^{-3}	7×10^{-8}	3×10^{-4}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Tl-202	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	2×10^{-7}	2×10^{-3}	8×10^{-9}	7×10^{-5}
	Tl-204	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	3×10^{-8}	2×10^{-3}	9×10^{-10}	6×10^{-5}
Thorium (90)	Th-227	S	3×10^{-10}	5×10^{-4}	1×10^{-11}	2×10^{-5}
		I	2×10^{-10}	5×10^{-4}	6×10^{-12}	2×10^{-5}
	Th-228	S	9×10^{-12}	2×10^{-4}	3×10^{-13}	7×10^{-6}
		I	6×10^{-12}	4×10^{-4}	2×10^{-13}	1×10^{-5}
	Th-230	S	2×10^{-12}	5×10^{-5}	8×10^{-14}	2×10^{-6}
		I	1×10^{-11}	9×10^{-4}	3×10^{-13}	3×10^{-5}
	Th-231	S	1×10^{-6}	7×10^{-3}	5×10^{-8}	2×10^{-4}
		I	1×10^{-6}	7×10^{-3}	4×10^{-8}	2×10^{-4}
	Th-232	S	3×10^{-11}	5×10^{-5}	1×10^{-12}	2×10^{-6}
		I	3×10^{-11}	1×10^{-3}	1×10^{-12}	4×10^{-5}
	Th-natural	S	6×10^{-11}	6×10^{-5}	2×10^{-12}	2×10^{-6}
		I	6×10^{-11}	6×10^{-4}	2×10^{-12}	2×10^{-5}
	Th-234	S	6×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}
		I	3×10^{-8}	5×10^{-4}	1×10^{-9}	2×10^{-5}
Thulium (69)	Tm-170	S	4×10^{-8}	1×10^{-3}	1×10^{-9}	5×10^{-5}
		I	3×10^{-8}	1×10^{-3}	1×10^{-9}	5×10^{-5}
	Tm-171	S	1×10^{-7}	1×10^{-2}	4×10^{-9}	5×10^{-4}
		I	2×10^{-7}	1×10^{-2}	8×10^{-9}	5×10^{-4}
Tin (50)	Sn-113	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	9×10^{-5}
		I	5×10^{-8}	2×10^{-3}	2×10^{-9}	8×10^{-5}
	Sn-125	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	8×10^{-8}	5×10^{-4}	3×10^{-9}	2×10^{-5}
Tungsten (74)	W-181	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	1×10^{-7}	1×10^{-2}	4×10^{-9}	3×10^{-4}
	W-185	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
	W-187	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}

R 325.5269 Appendix A9. Concentrations in air and water above natural background. Elements U to Z and certain unlisted radionuclides.

Rule 269. (See notes in Rule 270.)

	TABLE I	TABLE II

Element (atomic number)	Radionuclide*		Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)	Column 1 Air (µCi/ml)	Column 2 Water (µCi/ml)
Uranium (92)	U-230	S	3×10^{-10}	1×10^{-4}	1×10^{-11}	5×10^{-6}
		I	1×10^{-10}	1×10^{-4}	4×10^{-12}	5×10^{-6}
	U-232	S	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
		I	3×10^{-11}	8×10^{-4}	9×10^{-13}	3×10^{-5}
	U-233	S	5×10^{-10}	9×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
	U-234****	S	6×10^{-10}	9×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
	U-235****	S	5×10^{-10}	8×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	U-236	S	6×10^{-10}	1×10^{-3}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	1×10^{-3}	4×10^{-12}	3×10^{-5}
	U-238****	S	7×10^{-11}	1×10^{-3}	3×10^{-12}	4×10^{-5}
		I	1×10^{-10}	1×10^{-3}	5×10^{-12}	4×10^{-5}
	U-240	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	3×10^{-5}
	U-natural ****	S	1×10^{-10}	1×10^{-3}	5×10^{-12}	3×10^{-5}
		I	1×10^{-10}	1×10^{-3}	5×10^{-12}	3×10^{-5}
Vanadium (23)	V-48	S	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
		I	6×10^{-8}	8×10^{-4}	2×10^{-9}	3×10^{-5}
Xenon (54)	Xe-131m	Sub**	2×10^{-5}	----------	4×10^{-7}	----------
	Xe-133m	Sub	1×10^{-5}	----------	3×10^{-7}	----------
	Xe-133	Sub	1×10^{-5}	----------	3×10^{-7}	----------
	Xe-135	Sub	4×10^{-6}	----------	1×10^{-7}	----------
Ytterbium (70)	Yb-175	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Yttrium (39)	Y-90	S	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
		I	1×10^{-7}	6×10^{-4}	3×10^{-9}	2×10^{-5}
	Y-91m	S	2×10^{-5}	1×10^{-1}	8×10^{-7}	3×10^{-3}
		I	2×10^{-5}	1×10^{-1}	6×10^{-7}	3×10^{-3}
	Y-91	S	4×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
		I	3×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
	Y-92	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Y-93	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
Zinc(30)	Zn-65	S	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
		I	6×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
	Zn-69m	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Zn-69	S	7×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
		I	9×10^{-6}	5×10^{-2}	3×10^{-7}	2×10^{-3}
Zirconium (40)	Zr-93	S	1×10^{-7}	2×10^{-2}	4×10^{-9}	8×10^{-4}

		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	8×10^{-4}
	Zr-95	S	1×10^{-7}	2×10^{-3}	4×10^{-9}	6×10^{-5}
		I	3×10^{-8}	2×10^{-3}	1×10^{-9}	6×10^{-5}
	Zr-97	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	9×10^{-8}	5×10^{-4}	3×10^{-9}	2×10^{-5}
Any single radionuclide not listed in Appendix A1 to A9 with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours. Sub			1×10^{-6}	----------	3×10^{-8}	----------
Any single radionuclide not listed in Appendix A1 to A9 with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than 2 hours.			3×10^{-9}	9×10^{-5}	1×10^{-10}	3×10^{-6}
Any single radionuclide not listed in Appendix A1 to A9 which decays by alpha emission or spontaneous fission.			6×10^{-13}	4×10^{-7}	2×10^{-14}	3×10^{-8}

R 325.5270 Notes to Appendices A1 to A9.
Rule 270.
*Soluble (S): Insoluble (I).

**"Sub" means that values given are for submersion in a semi-spherical infinite cloud of airborne material.

***For purposes of these rules, it may be assumed that the daughter activity concentrations in the following table are equivalent to an air concentration of 10^{-7} microcuries of radon-222 per milliliter of air in equilibrium with the daughters polonium-218, lead-214, bismuth-214, and polonium-214:

Maximum Time Between Collection and Measurement (hours)*†	Alpha-Emitting Daughter Activity Collected per Milliliter of Air	
	Microcuries per milliliter	Total Alpha Disintegrations per minute per milliliter
0.5	7.2×10^{-8}	0.16
1.0	4.5×10^{-8}	0.10
2.0	1.3×10^{-8}	0.028
3.0	0.3×10^{-8}	0.0072

*†The duration of sample collection and the duration of measurement should be sufficiently short compared to the time between collection and measurement, as not to have a statistically significant effect upon the results.

****For soluble mixtures of U-238, U-234, and U-235 in air**,** chemical toxicity may be the limiting factor. If the percent by weight (enrichment) of U-235 is less than 5, the concentration value for a 40-hour workweek, table I, is 0.2 milligrams uranium per cubic meter of air average. For any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed 8 x 10^{-3} SA µCi-hr/ml, where SA is the specific activity of the uranium inhaled. The concentration value for table II is 0.007 milligrams uranium per cubic meter of air. The specific activity for natural uranium is 6.77 x 10^{-7} curies per gram U. The specific activity for other mixtures of U-238, U-235**,** and U-234, if not known, shall be:

SA = 3.6 x 10^{-7} curies/gram U U-depleted
SA = $(0.4 + 0.38\ E + 0.0034\ E^2)\ 10^{-6}$ $E \geq 0.72$ where E is the percentage by weight of U-235, expressed as percent.

NOTE: In any case where there is a mixture in air or water of more than 1 radionuclide, the limiting values for purposes of this appendix should be determined as follows:

1. If the identity and concentration of each radionuclide in the mixture are known, the limiting values should be derived as follows: Determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix "A" for the specific radionuclide when not in a mixture. The sum of such ratios for all the radionuclides in the mixture may not exceed "1" (i.e., "unity").

Example: If radionuclides a, b, and c are present in concentrations C_a, C_b, and C_c, and if the applicable Maximum Permissible Concentrations (MPC's) are MPC_a, MPC_b, and MPC_c respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_a}{MPC_a} + \frac{C_b}{MPC_b} + \frac{C_c}{MPC_c} \leq 1$$

2. If either the identity or the concentration of any radionuclide in the mixture is not known, the limiting values for purposes of Appendix "A" shall be:
  a. For purposes of Table I, Column 1 6 x 10^{-13}
  b. For purposes of Table I, Column 2 4 x 10^{-7}
  c. For purposes of Table II, Column 1 2 x 10^{-14}
  d. For purposes of Table II, Column 2 3 x 10^{-8}
3. If any of the conditions specified hereinafter are met, the corresponding values specified there may be used in lieu of those specified in Paragraph 2 above.
  a. If the identity of each radionuclide in the mixture is known but the concentration of one or more of the radionuclides in the mixture is not known, the concentration limit for the mixture is the limit specified in Appendix "A" for the radionuclide in the mixture having the lowest concentration limit; or,
  b. If the identity of each radionuclide in the mixture is not known, but it is known that certain radionuclides specified in Appendix "A" are not present in the mixture, the concentration limit for the mixture is the lowest concentration limit specified in Appendix "A" for any radionuclide that is not known to be absent from the mixture; or

	TABLE I		TABLE II	
c. Element (atomic number) and radionuclide	Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)	Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)
If it is known that Sr-90, I-125, I-126, I-129, I-131, (I-133, Table II only), Pb-210, Po-210, At-211, Ra-223, Ra-224, Ra-226, Ac-227, Ra-228, Th-230, Pa-231, Th-232, Th-nat, Cm-248, Cf-254, and Fm-256 are not present	----------	9×10^{-5}	----------	3×10^{-6}
If it is known that Sr-90, I-125, I-126, I-129, I-131, (I-133, Table II only), Pb-210, Po-210, Ra-223, Ra-226, Ra-228, Pa-231, Th-nat, Cm-248, Cf-254, and Fm-256 are not present	----------	6×10^{-5}	----------	2×10^{-6}
If it is known that Sr-90, I-129, (I-125, I-126, I-131, Table II only), Pb-210, Ra-226, Ra-228, Cm-248, and Cf-254 are not present	----------	2×10^{-5}	----------	6×10^{-7}
If it is known that (I-29, Table II only), Ra-226, and Ra-228 are not present	----------	3×10^{-6}	----------	1×10^{-7}
If it is known that alpha-emitters and Sr-90, I-129, Pb-210, Ac-227, Ra-228, Pa-230, Pu-241, and Bk-249 are not present	3×10^{-9}	----------	1×10^{-10}	----------
If it is known that alpha-emitters and Pb-210, Ac-227, Ra-228, and Pu-241 are not present	3×10^{-10}	----------	1×10^{-11}	----------
If it is known that alpha-emitters and Ac-227 are not present	3×10^{-11}	----------	1×10^{-12}	----------
If it is known that Ac-227, Th-230, Pa-231, Pu-238, Pu-239, Pu-240, Pu-242, Pu-244, Cm-248, Cf-249 and Cf-251 are not present	3×10^{-12}	----------	1×10^{-13}	----------

4. If the mixture of radionuclides consists of uranium and its daughter products in ore dust before chemical processing of the uranium ore, the values specified below may be used in lieu of those determined in accordance with Paragraph 1 above or those specified in Paragraphs 2 and 3.

a. For purposes of Table I, Column 1, 1×10^{-10} μCi/ml gross alpha activity; or 5×10^{-11} μCi/ml natural uranium; or 75 micrograms per cubic meter of air natural uranium.

b. For purposes of Table II, Column 1, 3×10^{-12} μCi/ml gross alpha activity; or 2×10^{-12} μCi/ml natural uranium; or 3 micrograms per cubic meter of air natural uranium.

5. For purposes of this note, a radionuclide may be considered as not present in a mixture if (a) the ratio of the concentration of that radionuclide in the mixture (C_a) to the concentration limit for that radionuclide specified in table II of Appendix "A" (MPC_a) does not exceed 1/10,

$$\left(\text{i.e., } \frac{C_a}{MPC_a} \leq \frac{1}{10}\right)$$

and (b) the sum of such ratios for all radionuclides considered as not present in the mixture does not exceed ¼, i.e.,

$$\left(\text{i.e., } \frac{C_a}{MPC_a} + \frac{C_b}{MPC_b} + \ldots\ldots \leq \frac{1}{4}\right)$$

R 325.5271 Appendix B. Reference quantities for posting and disposal Rule 271.

Radionuclide	Microcuries
Americium 241	.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
Cobalt 60	1

Copper 64	100
Dysprosium 165	10
Dysprosium 166	100
Erbium 169	100
Erbium 171	100
Europium 152 (9.2h)	100
Europium 152 (13yr)	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
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	.01
Polonium 210	0.1
Potassium 42	10
Praseodymium 142	100
Praseodymium 143	100
Promethium 147	10
Promethium 149	10
Radium 226	.01
Radon 222	.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
Strontium 90	0.1
Strontium 91	10
Strontium 92	10
Sulfur 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)	100*
Thulium 170	10
Thulium 171	10
Tin 113	10
Tin 125	10
Tungsten 181	10
Tungsten 185	10
Tungsten 187	100
Uranium (natural)	100**
Uranium 233	.01
Uranium 234 - 235	.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
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

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

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

NOTE: For purposes of Rules 224 to 231, where there is involved a combination of nuclides in known amounts, the limit for the combination should be derived as follows: Determine, for each nuclide in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific nuclide when not in combination. The sum of such ratios for all the nuclides in the combination may not exceed "1" (i.e., "unity").

R 325.5273 Rescinded.

R 325.5274 Rescinded.

PART 6. INDUSTRIAL RADIOGRAPHIC OPERATIONS AND INSTALLATIONS

R 325.5281 Rescinded.

R 325.5282 Rescinded.

R 325.5285 Rescinded.

R 325.5286 Rescinded.

R 325.5287 Rescinded.

R 325.5288 Rescinded.

R 325.5289 Rescinded.

R 325.5290 Rescinded.

R 325.5291 Rescinded.

R 325.5293 Rescinded.

R 325.5294 Rescinded.

R 325.5296 Rescinded.

R 325.5297 Rescinded.

R 325.5298 Rescinded.

R 325.5299 Rescinded.

R 325.5301 Rescinded.

R 325.5302 Rescinded.

R 325.5303 Rescinded.

R 325.5305 Rescinded.

R 325.5306 Rescinded.

R 325.5307 Rescinded.

R 325.5309 Rescinded.

PART 7. MEDICAL X-RAY INSTALLATIONS

R 325.5311 Rescinded.

R 325.5312 Rescinded.

R 325.5315 Rescinded.

R 325.5317 Rescinded.

R 325.5321 Rescinded.

R 325.5322 Rescinded.

R 325.5323 Rescinded.

R 325.5325 Rescinded.

R 325.5331 Rescinded.

R 325.5333 Rescinded.

R 325.5337 Rescinded.

R 325.5347 Rescinded.

R 325.5348 Rescinded.

R 325.5351 Rescinded.

R 325.5352 Rescinded.

R 325.5353 Rescinded.

R 325.5355 Rescinded.

R 325.5357 Rescinded.

R 325.5358 Rescinded.

R 325.5359 Rescinded.

R 325.5361 Rescinded.

R 325.5362 Rescinded.

R 325.5365 Rescinded.

R 325.5366 Rescinded.

R 325.5368 Rescinded.

R 325.5371 Rescinded.

R 325.5372 Rescinded.

R 325.5373 Rescinded.

R 325.5375 Rescinded.

R 325.5376 Rescinded.

R 325.5378 Rescinded.

R 325.5379 Rescinded.

R 325.5380 Rescinded.

R 325.5381 Rescinded.

R 325.5383 Rescinded.

R 325.5384 Rescinded.

R 325.5385 Rescinded.

R 325.5386 Rescinded.

R 325.5388 Rescinded.

R 325.5389 Rescinded.

R 325.5390 Rescinded.

R 325.5391 Rescinded.

R 325.5395 Rescinded.

R 325.5396 Rescinded.

R 325.5397 Rescinded.

PART 10. VETERINARY X-RAY INSTALLATIONS

R 325.5401 Rescinded.

R 325.5402 Rescinded.

R 325.5403 Rescinded.

R 325.5404 Rescinded.

R 325.5405 Rescinded.

R 325.5407 Rescinded.

R 325.5409 Rescinded.

R 325.5411 Rescinded.

R 325.5417 Rescinded.

R 325.5418 Rescinded.

R 325.5421 Rescinded.

R 325.5422 Rescinded.

R 325.5423 Rescinded.

R 325.5425 Rescinded.

PART 11. PARTICLE ACCELERATOR INSTALLATIONS

R 325.5431 Purpose and scope.

Rule 431. (1) This part establishes procedures for the licensing or registration of particle accelerators, a classification system for particle accelerator installations and use, and radiation safety requirements for persons utilizing all types of particle accelerators except those specifically exempted from this part.

(2) This part applies to all licensees and registrants who use particle accelerators for any purpose other than those exempted under Rule 432.

(3) In addition to the requirements of this part, all licensees and registrants are subject to the applicable provisions of the other parts.

R 325.5432 Definitions.

Rule 432. (1) "Particle accelerator" or "accelerator", as used in this part, means a radiation machine designed for or capable of accelerating electrically charged particles, such as electrons, protons, or deuterons, with an electrical potential in excess of 1 MeV. Radiation machines designed and used exclusively for the production of electron beams or x- radiation for any of the following purposes, except those capable of producing radioactive material in excess of exempt quantities listed in schedule B of Rule 147, are excluded from this definition:

(a) The diagnosis or treatment of patients.

(b) Industrial radiography.

(c) Examination of the microscopic structure of materials.

(d) Manufacturing process control.

(e) Research and development.

(f) Demonstration of scientific principles for educational purposes.

(2) "Radiation protection supervisor" means 1 specific individual appointed by the licensee or registrant who has been delegated the responsibility and authority to govern the operation of the accelerator in such a manner as to comply with the provisions of this part and part 5 and to enforce any written procedures approved by the department.

LICENSE OR REGISTRATION

R 325.5435 General provisions.
Rule 435. Except as otherwise provided in these rules, a person shall not manufacture, produce, own, receive, acquire, possess, use, transport, transfer, or dispose of a research, production, processing, or treatment particle accelerator capable of producing radioactive material in excess of exempt quantities listed in schedule B of Rule 147 unless authorized in a specific license issued pursuant to part 2.

R 325.5437 Rescinded.

R 325.5438 Rescinded.

R 325.5439 Rescinded.

R 325.5440 Rescinded.

R 325.5441 Rescinded.

R 325.5442 Rescinded.

SAFETY REQUIREMENTS FOR THE USE OF PARTICLE ACCELERATORS

R 325.5446 Limitations.
Rule 446. The radiation safety committee or the radiation protection supervisor may terminate the operations at an accelerator facility or of a class D operation if this action is deemed necessary to protect health and minimize danger to public health and safety or property.

R 325.5447 Shielding.
Rule 447. (1) The design and shielding specifications for an accelerator shall be submitted and approved before issuance of a license by the department. After construction and installation, the radiation safety of the installation shall be established by a protection survey conducted in accord with Rule 221. A written report of the initial survey shall be submitted to the department and approved in writing before continued operation of the accelerator.
(2) Each accelerator installation shall be provided with such primary or secondary barriers as are necessary to assure compliance with Rules 203, 205, and 211.

R 325.5448 Rescinded.

R 325.5449 Rescinded.

R 325.5450 Equipment control and operations.
Rule 450. (1) A building housing a fixed particle accelerator shall not be left unattended without locking the building or portions thereof in some manner that will prevent unauthorized

entry into the control room or target room, or any access to areas that may contain induced radioactivity resulting from accelerator operation.

(2) A mobile or portable particle accelerator shall not be left unattended without locking the room or building in which it is housed in some manner that will prevent its removal by unauthorized persons.

(3) Access to or possession of keys or combinations used to comply with the requirements of this rule shall be limited to specific authorized persons approved by the radiation protection supervisor.

R 325.5452 Radiation surveys.

Rule 452. (1) A licensee or registrant shall maintain at each accelerator installation appropriate calibrated and operable portable radiation monitoring instruments to make physical radiation surveys as required by this part and part 5.

(2) Portable radiation monitoring instruments shall be capable by design, calibration, and operation of measuring the intensity of the various types and energies of radiation produced by the accelerator. These instruments shall be tested for proper operation at the beginning of each day they are to be used and calibrated at intervals not to exceed 3 months.

(3) During repair or calibration of a radiation monitoring instrument, a spare calibrated and operable instrument shall be provided or accelerator operations which require the instrument shall be terminated until required instrumentation is available.

(4) A radiation protection survey shall be performed and documented in accord with Rule 221 when changes have been made in shielding, operation, equipment, or occupancy of adjacent areas, and periodically to check for unknown changes and malfunctioning equipment.

(5) Whenever applicable, periodic surveys shall be made to determine the amount of airborne radioactivity present in areas of airborne hazards.

(6) Whenever applicable, periodic smear surveys shall be made to determine the degree of contamination in target and other pertinent areas.

(7) All area surveys shall be made in accordance with the written procedures established by a health physics consultant or the radiation protection supervisor of the accelerator facility and approved by the department.

(8) Records of all radiation protection surveys, calibration results, instrumentation tests, and smear results shall be kept current and on file at each accelerator facility.

R 325.5454 Ventilation systems.

Rule 454. (1) An accessible airborne radioactivity area shall be provided with ventilation adequate to reduce airborne radioactivity to concentrations that do not exceed the limits specified in column 1, table I of Rules 261 to 269.

(2) A licensee or registrant shall not vent, release, or otherwise discharge concentrations of radioactive material from an airborne radioactivity area to an uncontrolled area that exceed the limits specified in table II of Rules 261 to 269 except as authorized pursuant to subrule of Rule 238(2) of part 5. For purposes of this subrule, concentrations may be averaged over a period not greater than 1year.

R 325.5455 Special precautions.

Rule 455. A licensee or registrant shall not permit dismantling, repair, or servicing of any portion of the accelerator or changing of target materials by any persons unless such persons

have been approved for such activity by the radiation protection supervisor. The radiation protection supervisor shall determine that such persons are the following:
(a) Qualified by training or experience to conduct such activities safely with respect to potential radiation hazards.
(b) Knowledgeable regarding the potential hazards of induced radioactivity.
(c) Provided with appropriate monitoring instruments and dosimeters.
(d) Informed of any special procedures or precautions necessary to protect themselves and others from radiation exposure or spread of contamination.

PART 12. SEALED RADIOACTIVE SOURCES IN THE HEALING ARTS

R 325.5461 Rescinded.

R 325.5462 Rescinded.

R 325.5464 Rescinded.

R 325.5465 Rescinded.

R 325.5466 Rescinded.

R 325.5468 Rescinded.

R 325.5471 Rescinded.

R 325.5474 Rescinded.

R 325.5475 Rescinded

PART 13. MISCELLANEOUS SOURCES

R 325.5481 Purpose and scope.
Rule 481. (1) This part establishes radiation safety requirements for miscellaneous radiation sources and for persons utilizing such sources not exempted under Rules 31 to 33 and not specifically covered elsewhere by these rules.
(2) This part applies to all persons who use sources of radiation not specifically covered by the other parts.
(3) In addition to the requirements of this part all persons and activities covered by this part are subject to the applicable provisions of parts 1, 2, and 5.

R 325.5482 Rescinded.

R 325.5484 Rescinded.

R 325.5485 Rescinded.

R 325.5486 Rescinded.

R 325.5487 Rescinded.

R 325.5491 Rescinded

R 325.5492 Rescinded

R 325.5493 Rescinded.

R 325.5494 Rescinded.

R 325.5495 Rescinded.

R 325.5501 Rescinded.

R 325.5505 Rescinded.

R 325.5506 Rescinded.

R 325.5507 Rescinded.

R 325.5508 Rescinded.

OTHER MISCELLANEOUS SOURCES

R 325.5511 License or registration conditions.
Rule 511. Types of radiation sources and uses not specifically covered by these rules shall be subject to specific requirements designated by the department in the form of license or registration conditions for the protection of public health, safety, and property until such time that these rules are amended to specifically cover such sources and uses.

R 325.5601 Rescinded.

R 325.5601a Rescinded.

R 325.5602 Rescinded.

R 325.5603 Rescinded.

R 325.5605 Rescinded.

R 325.5606 Rescinded.

R 325.5607 Rescinded.

R 325.5608 Rescinded.

R 325.5609 Rescinded.

R 325.5610 Rescinded.

R 325.5611 Rescinded.

R 325.5612 Rescinded.

R 325.5613 Rescinded.

R 325.5626 Rescinded.

R 325.5627 Rescinded.

R 325.5628 Rescinded.

R 325.5629 Rescinded.

R 325.5630 Rescinded.

R 325.5634 Rescinded.

R 325.5635 Rescinded.

R 325.5637 Rescinded.

R 325.5655 Rescinded.

R 325.5656 Rescinded.

R 325.5657 Rescinded.

R 325.5658 Rescinded.

R 325.5667 Rescinded.

R 325.5668 Rescinded.

R 325.5669 Rescinded.

R 325.5674 Rescinded.

R 325.5675 Rescinded.

R 325.5676 Rescinded.

R 325.5677 Rescinded.

R 325.5678 Rescinded.

R 325.5679 Rescinded.

R 325.5681 Rescinded.

R 325.5682 Rescinded.

R 325.5683 Rescinded.

R 325.5684 Rescinded.

R 325.5685 Rescinded.

R 325.5686 Rescinded.

R 325.5687 Rescinded.

R 325.5688 Rescinded.

R 325.5689 Rescinded.

R 325.5690 Rescinded.

R 325.5691 Rescinded.

R 325.5692 Rescinded.

R 325.5693 Rescinded.

R 325.5694 Rescinded.

R 325.5695 Rescinded.

R 325.5696 Rescinded.

R 325.5697 Rescinded.

R 325.5698 Rescinded.

PART 15. COMPUTED TOMOGRAPHY INSTALLATIONS

R 325.5701 Rescinded.

R 325.5703 Rescinded.

R 325.5705 Rescinded.

R 325.5707 Rescinded.

R 325.5709 Rescinded.

R 325.5711 Rescinded.

R 325.5713 Rescinded.

R 325.5715 Rescinded.

R 325.5717 Rescinded.

R 325.5719 Rescinded.

R 325.5721 Rescinded.

ADMINISTRATIVE RULES

DEPARTMENT OF HEALTH AND HUMAN SERVICES

OFFICE OF THE STATE REGISTRAR

CANCER REPORTING

Filed with the Secretary of State on May 27, 2016

These rules become effective immediately upon filing with the Secretary of State unless adopted under section 33, 44, or 45a(6) of 1969 PA 306. Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the department of health and human services by section 2619 of 1978 PA 368, MCL 333.2619)

R 325.9050, R 325.9051, and R 325.9052 are amended; and R 325.9057 is rescinded in the Code as follows:

R 325.9050 Registry.

Rule 9050. (1) The department shall establish a registry to record cases of cancer and other specified tumorous and precancerous diseases that occur in the state. The registry shall include information concerning these cases as the department considers necessary and appropriate to conduct epidemiologic surveys of cancer and cancer-related diseases in the state.

(2) Each diagnosed case of cancer and other specified tumorous and precancerous diseases shall be reported to the department pursuant to subrule (4) of this rule, or reported to a cancer reporting registry if the cancer reporting registry meets standards established pursuant to subrule (4) of this rule by a reporting entity as defined in R 325.9051 to ensure the accuracy and completeness of the reported information. A reporting entity required to report a diagnosis pursuant to subrule (4) of this rule may elect to report the diagnosis to the state through an existing cancer registry only if the registry meets minimum reporting standards established by the department.

(3) The department shall maintain comprehensive records of all reports submitted pursuant to this rule. These reports shall be subject to the same requirements of confidentiality as provided in section 2631 of the public health code, 1978 PA 368, MCL 333.2619 for data or records concerning medical research projects.

(4) The director shall provide for all of the following:

(a) A list of tumorous and precancerous disease other than cancer to be reported pursuant to subrule (2) of this rule.

(b) The quality and manner in which the cases and other information described in subrule (1) of this rule are reported to the department.

(c) The terms and conditions under which records disclosing the name and medical condition of a specific individual and kept pursuant to this rule are released by the department.

(5) This rule does not require an individual to submit to medical or department examination or supervision.

(6) The department may contract for the collection and analysis of, and research related to, the epidemiologic data required by this rule.

(7) Within 2 years after the effective date of these rules, the department shall begin evaluating the reports collected pursuant to subrule (2) of this rule. The department shall publish and make available to the public reports summarizing the information collected.

(8) Reporting pursuant to subrule (2) of this rule shall begin the next calendar year after the effective date of this rule.

R 325.9051 Definitions.

Rule 9051. As used in these rules:

(a) "Primary brain-related tumor" means a primary tumor, whether malignant or benign, of the brain, meninges, spinal cord, cauda equina, a cranial nerve or nerves, or any part of the central nervous system or of the pituitary gland, pineal gland, or craniopharyngeal gland.

(b)"Cancer" means all diagnoses with a behavior code of 2 (carcinoma in situ) or 3 (malignant primary site) which is listed in publication found in department policy and made available to the public including carcinomas of skin of the vagina, prepuce, clitoris, vulva, labia, penis, and scrotum but excluding basal, epithelial, papillary, and squamous cell carcinomas of the skin.

(c) "Department" means the department of health and human services.

(d) “Reporting entity or reporting entities” means an individual, facility, or other entity described in these rules as required to report patient information with a diagnosed cancer or other reportable condition to the state cancer registry. A reporting entity includes the following:

(i) Physician as defined in sections 17001 and 17501 of the public health code, 1978 PA 368, MCL 333.17001 and 333.17501.

(ii) Dentist as defined in in section 16601 of the public health code, 1978 PA 368, MCL 333.16601.

(iii) Hospital as defined in section 20106 of the public health code, 368 PA 1978 of the public health code, MCL 333.20106.

(iv) Clinic defined as an outpatient facility that provides advice, counseling, diagnosis, treatment, surgery, care, or services relating to the preservation or maintenance of health.

(v) Clinical laboratory as defined in section 20104 of the public health code, 1978 PA 368, MCL 333.20104.

R 325.9052 Reportable diagnoses.

Rule 9052. (1) Cancer diagnoses, diagnoses of benign brain-related tumors, and any tumorous and precancerous diseases otherwise required to be reported by state or federal law shall be reported to the department in a manner consistent with these rules and procedures issued by the department.

(2) Diagnoses shall be reported by all reporting entities.

(3) A reporting entity may elect to report cases through a hospital or regional cancer registry that meets the rules set by the department.

(4) Reports shall be submitted within 180 days of a diagnosis on a form prescribed or approved by the department, except for reports forwarded on electronic media.

(5) Reports submitted on electronic media shall meet data quality, format, and timeliness standards prescribed by the department.

R 325.9057 Rescinded.

ADMINISTRATIVE RULES

DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

LAND CORNER RECORDATION

GENERAL RULES

Filed with the Secretary of State on May 19, 2016

These rules take effect immediately after filed with the Secretary of State

(By authority conferred on the department of licensing and regulatory affairs by section 5 of 1970 PA 74, MCL 54.205, and Executive Reorganization Order Nos. 1996-2, 1997-12, 2003-1, 2008-4, 2011-4, being MCL 445.2001, 445.2002, 445.2011, 445.2025, and 445.2030)

R 54.251, R 54.252, and R 54.253 are added to the Michigan Administrative Code as follows:

R 54.251 Definitions.
Rule 51. (1) As used in these rules:
(a) "Act" means the corner recordation act, 1970 PA 74, MCL 54.201 to 54.210d.
(b) "Corner code" means the alphanumeric designation given a corner based on its location within the survey township.
(c) "Survey township" means a standard 6-mile square or fractional public land survey township that is designated by a township number and direction north or south of the Michigan baseline and a range number and direction east or west of the Michigan meridian.
(2) Terms defined in the act have the same meanings when used in these rules.

R 54.252 Land corner recordation certificate; content.
Rule 52. The land corner recordation certificate shall comply with all of the following:
(a) Meet the filing requirements for recording documents with the register of deeds under the recording requirements of 1937 PA 103, MCL 565.201 to 565.203.
(b) Be filed on a form titled land corner recordation certificate.
(c) Identify the legal authority requiring the form and the content.
(d) Include the printed name of the surveyor responsible for the work.
(e) Specify the date that the corner was or corners were used or monumented.
(f) Include not more than 2 original public land survey corners or protracted public land survey corners, or a combination of both, each in the same survey township.
(g) Identify the county in which the corner or corners lie. For a corner that is common to 2 or more counties, identify each county on the same form and file a copy of the land corner recordation certificate with the register of deeds in each county.
(h) Include a graphical representation of the survey township.
(i) Identify the corner or corners that are not accessories based on their definitions in the act.
(j) Identify the survey township in which the corner lies. For a corner that is common to 2 or more survey townships, identify each survey township on the same form.

(k) Identify the corner or corners based on their corner codes. For a corner that has 2 or more corner codes, identify each corner code on the same form.
(l) Identify the section or sections, and as applicable, the claim, reserve, tract, or other alternatively defined original federal area in which the corner lies.
(m) Report all of the following on each page:
(i) Page number.
(ii) Total number of pages.
(iii) Survey township.
(iv) Corner code.
(n) Include a section labeled part A and titled corner history that contains all of the following:
(i) The description of the corner as it was monumented, including all of the following:
(A) The date the corner was monumented.
(B) The description of the monument placed.
(C) The name of surveyor responsible for monumenting the corner and the surveyor's license number, if applicable.
(D) The description of the document recording the monumenting of the corner and the document's recording data, if applicable.
(ii) The description of subsequent perpetuations or uses of the corner or references to the corner and each entry shall include all of the following:
(A) The date the corner was perpetuated, used, or referenced.
(B) The description of the monument perpetuated, used, or referenced.
(C) The name of the surveyor responsible for perpetuating, using, or referencing the corner and the surveyor's license number, if applicable.
(D) The description of the document recording the perpetuation or use of the corner or references to the corner and the document's recording data, if applicable.
(iii) If the land corner recordation certificate is being filed for a corner that is being monumented under section 3a or 4 of the act, MCL 54.203a or 54.204, the surveyor shall indicate under part A that the land corner recordation certificate is being filed for a corner that is being monumented.
(o) Include a section labeled part B and titled surveyor's report on perpetuation, restoration, reestablishment, or monumentation of corner. In this part, the surveyor shall do both of the following:
(i) Report on the evidence gathered, work performed, and decisions made.
(ii) Report how the evidence relates to the corner history and how it guided his or her decisions to perpetuate, restore, reestablish, or monument the corner.
(p) Include a section labeled part C and titled field evidence for perpetuation of corner that reports how the surveyor left the corner for future use. This part shall include both of the following:
(i) A description of the monument that includes all of the following:
(A) The monument material, including the component that generates the magnetic field required under section 2(f) of the act, MCL 54.202(f).
(B) The monument's dimensions when set, including the length and cross-section measurements.
(C) The monument's cross-section measurements when the monument is found in place.
(D) If capped, a description of the cap, including, but not limited to, the cap material and the surveyor's license number marked on the cap.
(ii) Accessories for each monument shall be listed with a detailed description for each accessory that includes both of the following:

(A) Type of object or objects making up the accessory and the point to which the measurement is made.
(B) The accessory's location as it relates to the monument location by reporting both of the following:
(1) Direction, as it is related to north, from the monument to the accessory and identification by definition of the basis for north being reported.
(2) Distance from the monument to the accessory and identification of the unit of measurement being reported.
(q) License number of the surveyor responsible for the work.
(r) Date that the surveyor signed the form.

R 54.253 Land corner recordation certificate; form.
Rule 53. The purpose of this rule is to prescribe the form of the land corner recordation certificate as required by the act.

Land Corner Recordation Certificate
Authority: 1970 PA 74

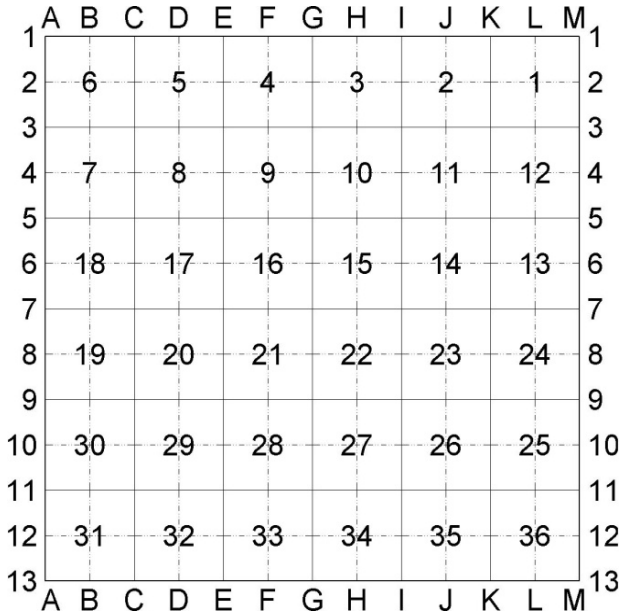
Surveyor's Name: _____ Field Survey Date: _____
For corner(s) in: _____County

Original
Public Land Survey Corner — Corner Code
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____

Property Controlling Corner — Corner Code
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____

Property Corner — Corner Code
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____

Protracted
Public Land Survey Corner — Corner Code
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____
S _____ T _____ R _____ _____



Part A: Corner History

Part B: Surveyor's Report on Perpetuation, Restoration, Reestablishment, or Monumentation of Corner

Part C: Field Evidence for Perpetuation of Corner

Surveyor's Signature _____ *Date* _____

Surveyor's Seal/Stamp

Professional Surveyor's License No.: _____
Prepared By: *Name, Address, City, State, Mail Code*

Land Corner Recordation Certificate
T_____ R_____ Code_____
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ADMINISTRATIVE RULES

DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

PUBLIC SERVICE COMMISSION

BASIC LOCAL EXCHANGE SERVICE CUSTOMER MIGRATION

Filed with the Secretary of State on May 24, 2016

These rules become effective June 17, 2016.

(By authority conferred on the public service commission by sections 202 and 213 of 1991 PA 179, MCL 484.2202 and 484.2213)

R 484.81, R 484.82, R 484.83, R 484.84, R 484.85, R 484.86, R 484.87, R 484.88, R 484.89, and R 484.90 of the Michigan Administrative Code are amended as follows:

PART 1. GENERAL PROVISIONS

R 484.81 Applicability.
Rule 1. These rules apply to the timely and complete transfer of an end user from 1 provider of basic local exchange service to another provider.

R 484.82 Exclusions.
Rule 2. Nothing in these rules prohibits providers from adopting more stringent standards in an interconnection agreement or other stand alone agreement.

R 484.83 Definitions.
Rule 3. (1) As used in these rules:
(a) "Act" means 1991 PA 179, MCL 484.2101 to 484.2602.
(b) “Basic local exchange service” or “local exchange service” or “service” means the provision of an access line and usage within a local calling area for the transmission of high-quality 2-way interactive switched voice or data communication.
(c) “Business day” means a day on which a provider’s office is scheduled to be open for business.
(d) “Business hours” means the times that a provider’s office is scheduled to be open for business. As scheduled business days and hours may vary, the schedule to be followed by each provider is the one posted on its website.
(e) "Commission" means the Michigan public service commission.
(f) “Customer service record” or “customer service information” means account information including, but not limited to, the customer’s address, features, services, equipment, directory listings, and network information, as appropriate.
(g) “Directory service provider” means the entity that receives or implements the local service provider’s directory service requirements for the end user, including white page listings, and may also include providing end user directory assistance.

(h) “End user” means the retail subscriber of a telecommunication service.
(i) “End user’s authorization” means the data or record indicating that the end user has authorized a new local service provider to change the end user’s service provider or view the end user’s customer service record.
(j) "Federal act" means the telecommunications act of 1996, 101 Stat 101 (1996).
(k) “Interconnection agreement” means an agreement between 2 or more providers entered into under sections 251 and 252 of the federal act.
(l) “Line level” means features or activities associated with a specific line.
(m) “Local service provider” means the provider that administers and bills local exchange and related services for the end user, and includes both of the following:
(i) "New local service provider" means the planned or actual provider of record following the completion of the migration process.
(ii) "Old local service provider" means the provider of record prior to the migration process or the current local service provider prior to service migration.
(n) “Local service request” means an industry standard document used among providers to request installation, changes, or disconnections of local services.
(o) “Loop” or “Unbundled loop” means the transmission facility between the network interface on a subscriber’s premises and the main distribution frame in the servicing central office.
(p) “Loss notification” means provider notification initiated by the underlying network service provider at the completion of a service migration to notify the old local service provider of the loss of end user facilities.
(q) “Number portability” means the ability of users of telecommunications services to retain, at the same location, existing telecommunications numbers without impairment of quality, reliability, or convenience when switching from 1 telecommunications provider to another.
(r) “Plain old telephone service” means the provision of a standard telephone line and telephone number, as subscribed to by a residential or small business end user.
(s) “Primary interexchange carrier” or “primary interexchange carriers” means the provider or providers designated by a wire line end user to carry intraLATA and/or interLATA long distance traffic.
(t) "Provider" means a person, firm, partnership, corporation, or other entity that provides basic local exchange service as defined by section 102(b) of the act.
(u) “Service configuration” means identification of the type of serving arrangement used by the local service provider to provide service to the end user, including resale, facility-based service, and other arrangements.
(v) “Service provider” means each provider involved in supplying service to an end user, including local service providers and/or underlying network service providers.
(w) “Underlying network service provider” means a provider that provides some or all of the facilities and equipment components used to make up an end user’s local telecommunications service, including both of the following:
(i) "New underlying network service provider" means a provider that provides some or all of the facilities and equipment components used to make up an end user’s local telecommunications service following the completion of the migration process or the potential network service provider prior to service migration.
(ii) "Old underlying network service provider" means a provider that provides some or all of the facilities and equipment components used to make up an end user’s local telecommunications service prior to the migration process or the current network service provider prior to service migration.
(2) A term defined in the act has the same meaning when used in these rules.

R 484.84 Expiration.
Rule 4. These rules expire 3 years from the effective date of the rules. The commission may promulgate new rules at any time.

PART 2. TRANSFER OF END USER BY PROVIDERS

R 484.85 Migration responsibilities of local service providers.
Rule 5. (1) Each service provider shall maintain a publicly accessible website with all of the following information:
(a) All applicable processes and procedures for end user migration.
(b) Company contact escalation list, which shall include a company contact for operational issues and a contact for escalation of those issues.
(2) The old local service provider shall release any assigned telephone numbers associated with the end user's service that are properly requested in accordance with industry standards and federal law.
(3) Except for migrations described in 47 CFR 64.1120(e), the new local service provider shall communicate directly with the end user, receive the end user's authorization to switch service providers, and provide all pertinent information to the end user associated with the end user migration.
(4) The new local service provider is responsible for the coordination required to migrate the end user. The underlying network service providers shall promptly provide necessary support and assistance to migrate the end user. Neither the old local service provider nor underlying network service provider shall interfere in the transfer or otherwise use this opportunity to win back the customer.
(5) Before requesting a customer service record, the new local service provider or authorized agent shall have obtained an end user's authorization.
(6) All providers shall follow industry standard procedures and federal law for porting an end user's telephone number and processing to actual completion the migration of the end user upon receipt of an accurate request from the new local service provider. For requests received outside of business hours, the date and time of receipt shall be considered to be the beginning of the next business day.
(7) When local exchange service to be migrated is currently provided using resale or local wholesale arrangements, the old underlying network service provider shall provide a loss notification to the old local service provider upon completion of a request.
(8) Upon completion of the service order, the old underlying network service provider shall unlock the end user's E911 records that are being migrated, within industry standard or federally mandated timeframes, whichever is earlier. The new underlying network service provider shall assure the new E911 database record is accurately entered into the E911 database and that the database is locked.
(9) Directory listing information shall be submitted by the new local service provider to the directory service provider using a local service request or other mutually agreeable format. If the old local service provider is a facilities-based provider and directory listing migration capabilities are not available from the directory service provider, then the old local service provider shall remove its listings upon completion of a local service request to migrate local service. The new local service provider shall ensure that the directory listing information is accurate.

(10) The new local service provider may reuse an unbundled loop upon request if reuse is technically feasible. Any of the following exclusions shall apply:
(a) The new local service provider has made all reasonable efforts to obtain the circuit identification for reuse, and the circuit identification information was not provided by the old local service provider.
(b) Upgrade or downgrade of existing facilities is required.
(11) The old local service provider shall release the circuit identification and facilities for reuse when the existing circuit or facilities are no longer needed by the old local service provider to provide service to the migrating end user or any other end user that is currently using those facilities.
(12) The old local service provider shall not retain a requested facility for possible future use.
(13) An unbundled loop shall be considered released for reuse when the old local service provider provides the circuit identification for release.
(14) Subject to subrule (10) of this rule, when requested, and reuse of the unbundled loop facility is available, the old local service provider shall provide the circuit identification number with the associated telephone number for the requested unbundled loop facility to the new local service provider as part of the customer service record or firm order confirmation response. To order the reuse of an unbundled loop facility, the new local service provider shall furnish the circuit identification number on the local service request issued to the new underlying network service provider.
(15) If the new local service provider requests reuse of the unbundled loop facility, and it is not available, then the old local service provider shall use best efforts to indicate as part of the customer service record or firm order confirmation response the reason why the unbundled loop is not reusable.
(16) The local service providers and underlying network service providers involved in the transfer shall maintain accurate unbundled loop circuit identification information and customer service record content, as applicable, to the end user service to facilitate migration activity as described in these rules.
(17) The underlying network service provider shall notify the local service providers involved in the transfer of changes affecting information contained in this rule within 5 business days of completion of the transfer.

R 484.86 Exchanging customer service information.
Rule 6. (1) Unless otherwise agreed to by the providers involved, all of the following shall be the responsibility of the local service providers in any migration of an end user's local service.
(a) The new local service provider may request and receive the customer service record information, which may include a request for circuit identification with associated telephone number from the old local service provider as part of the customer service record or firm order confirmation.
(b) To the extent resale and local wholesale arrangement information is available via current pre-order functionality in the underlying network service provider's operational support systems and is made available under current local business practice, it shall be made available to all new local service providers upon request and acknowledgement of end user permission. Underlying network service provider customer service record information might not reflect all end user services subscribed and received from the old local service provider.
(c) Customer service record requests shall only be submitted after proper authorization from the end user to review the end user's account and only with the intent to obtain information to facilitate the migration of local service.

(d) A customer service request or local service request shall not be used by a local service provider to trigger retention activity. The new local service provider shall not be required to share a copy of the end user's authorization with the old local service provider prior to receipt of the records, but shall retain records for a reasonable period of time to resolve issues about proper use of operational support systems or to assist in the resolution of a claim of unauthorized transfer, should one arise.

(e) All responses to customer service record requests shall be provided promptly, without unreasonable delay, and consistent with federal law.

(f) The deadline for submitting service requests shall be posted on a provider's website.

(g) Upon receiving a local service request, the receiving provider shall issue either a confirmation or rejection of an electronic request within the time required by federal law.

(h) A provider may require a customer service record request to include some or all of the following:

(i) Billed assigned telephone number.

(ii) Acknowledgement of end user consent to review the customer service record or customer service information.

(iii) End user name.

(iv) Contact information detailing to whom, how, and where to respond with the customer service record or customer service information.

(v) A telephone number and person to contact for questions about the customer service record or customer service information request.

(vi) The name of the company requesting the customer service record or customer service information.

(vii) The date and time the request was sent.

(viii) Indication whether circuit identification with associated telephone number is requested for loop reuse.

(ix) Indication whether directory information is requested.

(i) The old local service provider shall provide to the new local service provider all of the following information in addition to the fields required by federal law when applicable:

(i) Account level information including the following:

(A) Billing telephone number.

(B) Complete customer billing name and address.

(C) Directory listing information, including address and listing type, to the extent that it is maintained by the old local service provider.

(D) Complete service address including floor, suite, unit, or similar designation.

(E) Type of service.

(ii) Line level information shall include all services and features associated with the service provider, including the following:

(A) Assigned telephone number, which identifies all telephone numbers that are billed on the account.

(B) Current primary interexchange carrier selections including freeze status.

(C) Local freeze status, if offered.

(D) All vertical features such as custom calling features identified in a manner so that the new local service provider can understand to which products and services the end user currently subscribes.

(E) Other service options, such as lifeline, 900 blocking, toll blocking, remote call forwarding, and off premises extensions, if applicable.

(F) Service configuration information.

(G) Identification of the local service or underlying network service provider when different from the provider providing the response.
(H) Identification of any data services on the migrating end user's line or any other services such as alarm services that utilize the unbundled loop.
(I) Circuit identification with associated telephone number, provided with the customer service record, when requested and the unbundled loop is not being used for other services.
(J) Indication as to whether any circuit identifications are not reusable and therefore not provided.
(K) Type of service.
(j) If requested, the old local service provider shall provide the network information, including loop circuit identification (when the unbundled loop is available for reuse) and associated telephone number, with the customer service record or firm order confirmation. When service components such as loop and directory services are currently being provided to the end user by an entity other than the local service provider or the underlying network service provider the customer service record shall also include identification of those components and the associated service provider.
(k) The transmission of customer service records and customer service information requests and information shall be through electronic facsimile, electronic mail, electronic data interchange, graphical user interface, or any other means negotiated between the 2 providers. The transmission of customer service records and customer service information requests shall not be by voice telephone call. All providers shall, at a minimum, allow transmission of customer service record requests by facsimile.

Rule 484.87 Order process requirements.
Rule 7. All migration and ordering processes between providers shall follow the applicable industry standards and comply with federal law.

Rule 484.88 Service quality standards.
Rule 8. (1) Upon receipt of an accurate request from the new local service provider, the old local service provider shall port the telephone number and, if requested, transfer the unbundled loop to the new local service provider within the specified time period listed in subdivisions (a) and (b) of this subrule, unless a later due date is requested. If the old local service provider reschedules the original due date without the consent of the new local service provider, or the old local service provider fails to complete the migration by the original due date, the original due date shall be the one measured against. The following apply to due dates:
(a) Due dates for migrations involving number portability with or without a loop. For a migration request involving 1 to 18 lines, the due date is a monthly average of 4 business days after a request is made. Any migration request involving 19 or more lines involving number portability with or without a loop is a project for which a due date shall be negotiated.
(b) Due dates for migrations involving a simple port request only, for example, not for orders that require other facilities, such as loops. For a migration involving a simple port, the due date is the date required by 47 CFR 52.35. For migration involving simple ports for 2 to 30 lines, the old local service provider shall send a firm order confirmation within 24 hours and complete the porting of the telephone number to the new local service provider within 3 business days of the firm order confirmation. Any migration request that involves simple ports for 31 or more lines is a project for which a due date shall be negotiated.
(2) The provider shall keep records on provisioning due dates that are not met. This measurement shall be reported by the provider at an order level for resale plain old telephone

service, and at a feature or circuit level for resale specials and local wholesale arrangements. The records shall be available for review upon the request of commission staff.

(3) Data used to measure performance concerning due dates shall not include misses caused by either of the following:

(a) Action or inaction of the new local service provider or the end user.

(b) The number portability administration center.

PART 3. REMEDIES, WAIVER, AND GENERAL EXEMPTIONS

R 484.89 Remedies.

Rule 9. (1) If, after 3 consecutive months, a provider fails to meet 1 or more of the standards as set forth by these rules for each of the 3 months, then the provider shall notify commission staff within 10 days of such failure and the commission shall require the provider to take corrective action. This corrective action shall include, but is not limited to, the 2-part report described as follows:

(a) Part 1 of the report shall be a “root-cause” analysis of the reported level of performance, explaining why the reported performance failed to meet applicable service quality standard(s).

(b) Part 2 of the report shall be a “corrective action plan.” The plan shall be based on the causes for substandard performance identified in part 1, and it shall define actions proposed to bring performance up to a level at or above the applicable standard. This plan shall have a 90-day timeline within which the provider commits to bring its performance up to a level at or above the applicable standard.

(2) A provider shall deliver its 2-part report to the commission staff within 30 days after it files the report showing a failure to meet the prescribed standards. Unless otherwise requested by the commission staff, the provider shall provide a status report for each month thereafter until the provider meets the applicable service quality standard.

(3) This rule does not prohibit a provider from seeking commission action against another provider, nor does it prohibit the commission from investigating a provider’s compliance under its own motion under the Michigan telecommunications act, 1991 PA 179, MCL 484.2101 to MCL 484.2602.

(4) Violation of these rules may result in penalties issued under section 601 of the act, MCL 484.2601.

Rule 484.90 Waiver and general exemptions.

Rule 10. (1) A provider may petition for a permanent or temporary waiver or exception from these rules when qualifying circumstances beyond the control of the provider render compliance impossible or when compliance would be unduly economically burdensome or technologically infeasible.

(2) Qualifying circumstances include any of the following:

(a) The problem is or was attributable to an "act of God." The term "act of God” includes events such as any of the following:

(i) Flood.

(ii) Lightning.

(iii) Tornado.

(iv) Earthquake.

(v) Fire.

(vi) Blizzard.

(vii) Ice storm.

(viii) Widespread electrical power outage.
(ix) Other unusual natural or man-made disasters.
(b) There is a work stoppage or other work action, beyond the control of the provider, that causes or caused a significant reduction in hours worked.
(c) The problem occurs or occurred during a major failure. A major failure is a single event or occurrence that is not the direct result of action taken by the provider and that generates out-of-service reports affecting 100 or more access lines.
(d) The problem is or was caused by either the end user or by malicious damage to facilities by a third party outside the control of the provider.
(3) A provider may request a temporary waiver in order to have sufficient time to implement procedures and systems to comply with these rules.
(4) The provider shall notify the commission, in writing, within 20 business days of such an event that it intends to invoke the occurrence of an event described in subrule (2) of this rule. The notification to the commission shall include all of the following information:
(a) Specific description of the event and general impact.
(b) Date or dates of the event.
(c) Location affected, such as exchanges or wire centers.
(d) Estimated number of customers affected.
(5) The commission staff shall have 10 business days following the notification to advise the provider, in writing, of a dispute concerning the validity of the company's invocation of an event described in subrule (2) of this rule and the reasons for such dispute. If the dispute cannot be resolved within 10 business days of the commission staff's advice, then the provider shall file an application with the commission within 10 business days thereafter for resolution of the dispute.

ADMINISTRATIVE RULES

DEPARTMENT OF HEALTH AND HUMAN SERVICES

MEDICAL SERVICES ADMINISTATION

MSA PROVIDER HEARINGS

Filed with the secretary of state on May 19, 2016

These rules become effective immediately upon filing with the Secretary of State unless adopted under section 33, 44, or 45a(6) of 1969 PA 306. Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the executive director of the department of health and human services by sections 6 and 9 of 1939 PA 280, MCL 400.6 and 400.9, and Executive Reorganization Orders 2005-1 and 2011-4, MCL 445.2021 and 445.2030)

R 400.3402, R 400.3404, R 400.3405, and R 400.3406 are amended, and R 400.3408 of the Michigan Administrative Code is rescinded as follows:

R 400.3402 Definitions.
Rule 2. As used in these rules:
"Adverse action" means any of the following:
(i) A suspension or termination of provider participation in the medical assistance program.
(ii) A denial of an applicant's request for participation in the medical assistance program.
(iii) The reduction, suspension, or adjustments of provider payments.
(iv) Retroactive adjustments following the audit or review and determination of the daily reimbursement rates for institutional providers.
(b) "Applicant" means an individual, firm, corporation, association, agency, institution, or other legal entity that has applied to participate in the medical assistance program as a provider.

R 400.3404 Request for internal conference or appeal for administrative hearing.
Rule 4. (1) After notice of an adverse action, providers or applicants may request an internal conference or an appeal for administrative hearing.
(2) Providers and applicants must request an internal conference or an appeal for administrative hearing in writing which shall be received within 30 calendar days of the notice of adverse action unless otherwise specified in the notice of adverse action or if a different appeal period exists in state or federal regulations.
(3) If a provider or an applicant does not timely request an internal conference or appeal for administrative hearing after receiving notice of an adverse action, the notice of adverse action is final and the department may act on it.

R 400.3405 Internal Conference.

Rule 5. (1) Before a provider or an applicant requests an administrative hearing, a provider or an applicant may request an internal conference. The purpose of the internal conference is to determine whether the department action was taken according to policy.

(2) The provider or applicant may meet with a department staff member who acts as the appeals review officer from the appeals section or its successor section. The staff member is an impartial arbiter who facilitates the communication and the exchange of information between the provider or applicant and the department program staff.

(3) All requests for an internal conference must be submitted in writing to the department. The appeals review officer may deny requests for internal conferences received after 30 days or after the date specified in the notice of adverse action.

(4) A request must state all of the following:

(a) Item or items being appealed.

(b) The dollar amount involved, if any.

(c) All necessary documentation to support the reason for the internal conference.

(d) Failure to follow the requirements in this subrule may result in the denial of the internal conference by the appeals review officer.

(5) The appeals section must issue a decision within 30 days after the conclusion of the internal conference.

(6) Should the provider, applicant, and/or the department disagree with the internal conference decision, the provider, applicant, and/or the department has the right to an administrative hearing. Requests for an administrative hearing must be in writing and made within 30 days of the decision of the internal conference decision.

R 400.3406 Formal hearing.

Rule 6. (1) A provider or applicant is entitled to a formal hearing pursuant to chapter 4 of 1969 PA 306, MCL 24.271 to MCL 24.287, in any case in which there has been a final determination of an adverse action as defined in R 400.34012, except where that action is predicated upon the situation described in subrule (2) of this rule.

(2) A request for a formal hearing shall not be granted if the adverse action is the result of the revocation, suspension, or termination, by an authority other than the department, of the provider's license or certification to practice in the provider's profession or to operate a nursing home, hospital, or other such medical facility, and if the department is in receipt of a certified copy or formal notification of such revocation, suspension, or termination.

(3) A formal hearing shall be granted if the revocation, suspension, or termination of the provider's license, certification, or authorization is the result of a department action, unless the provider previously had an opportunity to have that action reviewed.

(4) Unless a written request for a formal hearing is received within 30 calendar days of notification of intent to terminate, the provider's participation shall automatically terminate as of the thirtieth calendar day after date of notification. Such termination shall then be a final and binding administrative determination.

(5) The request shall identify all of the following:

(a) Those aspects of the determination with which the provider or applicant is dissatisfied.

(b) An explanation of why the provider or applicant believes the determination on those matters is incorrect.

(c) The dollar amount, if any, involved.

(6) The request shall be submitted with any documentary evidence the provider or applicant considers necessary to support its position.

R 400.3408 Rescinded.

CERTIFICATE OF NEED
REVIEW STANDARDS

MCL 24.208 states in part:

Sec. 8. The State Office of Administrative Hearings and Rules shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:

* * *

(k) All of the items in section 7(l) after final approval by the certificate of need commission or the statewide health coordinating council under section 22215 or 22217 of the public health code, 1978 PA 368, MCL 333.22215 and 333.2217.

MCL 24.207 states in part:

Sec. 7. "Rule" means an agency regulation, statement, standard, policy, ruling, or instruction of general applicability that implements or applies law enforced or administered by the agency, or that prescribes the organization, procedure, or practice of the agency, including the amendment, suspension, or rescission of the law enforced or administered by the agency. Rule does not include any of the following:

* * *

(l) All of the following, after final approval by the certificate of need commission or the statewide health coordinating council under section 22215 or 22217 of the public health code, 1978 PA 368, MCL 333.22215 and 333.22217:
(i) The designation, deletion, or revision of covered medical equipment and covered clinical services.
(ii) Certificate of need review standards
(iii) Data reporting requirements and criteria for determining health facility viability.
(iv) Standards used by the department of community health in designating a regional certificate of need review agency.
(v) The modification of the 100 licensed bed limitation for short-term nursing care programs set forth in section 22210 of the public health code, 1978 PA 368, MCL 333.22210.

CERTIFICATE OF NEED REVIEW STANDARDS

CERTIFICATE OF NEED (CON) REVIEW STANDARDS
SYNOPSIS FOR PUBLICATION IN THE MICHIGAN REGISTER
PURSUANT TO THE ADMINISTRATIVE PROCEDURES ACT, 1969 PA 306, MCL 24.208(1)(k)

MAGNETIC RESONANCE IMAGING (MRI) SERVICES

Final Approval by the CON Commission 3/16/16 and Effective 5/27/16

The language changes include the following:

1. Section 2: Definition has been modified as follows:
   - "Special needs patient" means a non-sedated patient, either pediatric or adult, with any of the following conditions: down syndrome, autism, attention deficit hyperactivity disorder (ADHD), developmental delay, malformation syndromes, hunter's syndrome, multi-system disorders, psychiatric disorders, IMPLANTABLE CARDIAC DEVICES (ICDS), and other conditions that make the patient unable to comply with the positional requirements of the exam OR IS UNABLE TO COMPLY WITH THE MOTIONLESS REQUIREMENTS AND WHOSE RESULTING MOVEMENTS RESULT IN NON-DIAGNOSTIC QUALITY IMAGES THEREFORE REQUIRING THE TECHNOLOGIST TO REPEAT THE SAME SEQUENCE IN AN ATTEMPT TO OBTAIN A DIAGNOSTIC QUALITY IMAGE. Definition updated to better reflect practice and improve quality.
2. Section 4(2): Definition has been modified as follows:
   - "Repair an existing MRI unit" means restoring the ability of the system to operate within the manufacturer's specifications by replacing or repairing the existing components or parts of the system, including the magnet, pursuant to the terms of an existing maintenance agreement WITH THE MANUFACTURER OF THE MRI UNIT that does not result in a change in the strength of the MRI unit. Definition updated for clarity.
3. Section 4(3): Removed volume requirements for replacement of an MRI unit consistent with other CON review standards. Reduced regulation allows for facilities to more easily update equipment when it has surpassed its useful life.
4. Section 4(4): Removed volume requirements for replacement of an existing mobile MRI host site to a new location. Reduced regulation allows for facilities to more easily replace an existing mobile MRI host site to a new location.
5. Section 4(5): The 36-month in operation requirement is waived if one of the following has been met. Reduced regulation allows for facilities to more easily replace an existing fixed MRI service and its unit(s) to a new location in certain situations that are unforeseen to the applicant.
   - (i) THE OWNER OF THE BUILDING WHERE THE SITE IS LOCATED HAS INCURRED A FILING FOR BANKRUPTCY UNDER CHAPTER SEVEN (7) WITHIN THE LAST THREE YEARS;

- (ii) THE OWNERSHIP OF THE BUILDING WHERE THE SITE IS LOCATED HAS CHANGED WITHIN 24 MONTHS OF THE DATE OF THE SERVICE BEING OPERATIONAL;

Removed volume requirements for replacement of an existing fixed MRI service and its unit(s) to a new site in certain situations that are unforeseen to the applicant:

- (i) THE OWNER OF THE BUILDING WHERE THE SITE IS LOCATED HAS INCURRED A FILING FOR BANKRUPTCY UNDER CHAPTER SEVEN (7) WITHIN THE LAST THREE YEARS;
- (ii) THE OWNERSHIP OF THE BUILDING WHERE THE SITE IS LOCATED HAS CHANGED WITHIN 24 MONTHS OF THE DATE OF THE SERVICE BEING OPERATIONAL; OR
- (iii) THE MRI SERVICE BEING REPLACED IS PART OF THE REPLACEMENT OF AN ENTIRE HOSPITAL TO A NEW GEOGRAPHIC SITE AND HAS ONLY ONE (1) MRI UNIT.

6. Section 6: Modified the language consistent with other CON review standards to clarify that any acquisition of an existing MRI unit from an existing MRI service must be meeting volume requirements to be acquired.
7. Section 7: Modified the language consistent with other CON review standards to clarify that MRI adjusted procedures performed on a dedicated MRI unit cannot be used to demonstrate need or to satisfy MRI CON review standards requirements.
8. Section 14(2)(d)(i)(D): Updated name of document.
9. Section 18(4), (7), and (8): Revised for clarity.
10. Other technical edits.

Complete Standards

A complete set of the approved language can be found at www.michigan.gov/con. A hard copy may be obtained, for a fee, by sending a written request to:

Michigan Department of Health and Human Services
Office of Health Policy and Innovation
Planning and Access to Care Section
15th Floor Grand Tower Bldg.,
235 S. Grand Ave.
Lansing, MI 48933

(517) 335-6708

Email address: MDCH-ConWebTeam@michigan.gov

CORRECTION OF OBVIOUS ERRORS IN PUBLICATION

MCL 24.256(1) states in part:

"Sec. 56. (1) The Office of Regulatory Reform shall perform the editorial work for the Michigan register and the Michigan Administrative Code and its annual supplement. The classification, arrangement, numbering, and indexing of rules shall be under the ownership and control of the Office of Regulatory Reform, shall be uniform, and shall conform as nearly as practicable to the classification, arrangement, numbering, and indexing of the compiled laws. The Office of Regulatory Reform may correct in the publications obvious errors in rules when requested by the promulgating agency to do so…"

CORRECTION OF OBVIOUS ERRORS IN PUBLICATION

May 26, 2016

Ms. Deidre O'Berry
Office of Regulatory Reinvention
Department of Licensing and Regulatory Affairs
Ottawa Building - 611 West Ottawa Street
Lansing, Michigan 48933

Dear Ms. O'Berry:

SUBJECT: Request for Correction of the Michigan Administrative Code:
R 408.14201 to R 408.14273
General Industry Safety Standard Part 42 Forging

The Department of Licensing and Regulatory Affairs (LARA), as the promulgating agency, is writing to request that the Office of Regulatory Reinvention exercise its discretion to correct an obvious error in the Michigan Administrative Code (MAC), pursuant to Section 56(1), MCL 24.256, of the Administrative Procedures Act, 1969 PA 306, as amended.

The last word in (2)(a) is spelled wrong:

> **R 408.14273 Billet heating furnaces.**
> Rule 4273.
> (2) Radiant heat from a billet furnace shall be controlled by 1 or more of the following methods:
> (a) Reflective shields of aluminum or materials of equal reflectivity.

Please note the corrections as you deem appropriate.

If you have any questions, please contact me anytime.

Respectfully submitted,

Dena Hendon

Dena Hendon
Michigan Occupational Safety and Health Administration
MIOSHA Standards Analyst
517.284.7736

CORRECTION OF OBVIOUS ERRORS IN PUBLICATION

May 19, 2016

Ms. Deidre O'Berry
Office of Regulatory Reinvention
Department of Licensing and Regulatory Affairs
Ottawa Building - 611 West Ottawa Street
Lansing, Michigan 48933

Dear Ms. O'Berry:

SUBJECT: Request for Correction of the Michigan Administrative Code R 408.41001 - 408.41099
Construction Safety Standard Part 10 Cranes and Derricks

The Department of Licensing and Regulatory Affairs (LARA), as the promulgating agency, is writing to request that the Office of Regulatory Reinvention exercise its discretion to correct an obvious error in the Michigan Administrative Code (MAC), pursuant to Section 56(1), MCL 24.256, of the Administrative Procedures Act, 1969 PA 306, as amended.

The correct language is yellow highlighted below. The corrections are in the following rules:

R 408.41037e Annual and comprehensive inspection.

Rule 1037e. (5) If the qualified person determines that a deficiency is a safety hazard, the employer shall ensure that the equipment is taken out of service until it has been corrected, except when temporary alternative measures are implemented as specified in R 408.41052a or R 408.41052c. See R 408.41053.

R 408.41038b Annual and comprehensive inspection.

Rule 1038b. (4) The inspection required by this rule shall be documented according to R 408.41037e(7).

Please note the corrections as you deem appropriate.

EXECUTIVE ORDERS
AND
EXECUTIVE REORGANIZATION ORDERS

MCL 24.208 states in part:

"Sec. 8. (1) The Office of Regulatory Reform shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:

(a) Executive orders and executive reorganization orders."

EXECUTIVE ORDERS

EXECUTIVE ORDER
No. 2016 - 9

CREATION OF THE CHILD LEAD POISONING ELIMINATION BOARD

EXECUTIVE OFFICE OF THE GOVERNOR

WHEREAS, Section 1 of Article V of the Michigan Constitution of 1963 vests the executive power in the Governor; and

WHEREAS, Section 4 of Article V of the Michigan Constitution of 1963 authorizes the establishment of temporary commissions or agencies for special purposes; and

WHEREAS, under Section 1 of 1931 PA 195, MCL 10.51, the Governor may, at such times and for such purposes as the Governor deems necessary or advisable, create special advisory bodies consisting of as many members as the Governor deems appropriate; and

WHEREAS, Section 17 of Article V of the Michigan Constitution of 1963 empowers the Governor to present to the Legislature information as to the affairs of the state and recommend measures that he considers necessary or desirable; and

WHEREAS, the issue of child lead poisoning in Flint has highlighted the prevalence of child lead poisoning throughout the state of Michigan; and

WHEREAS, there exists a need in state government for a coordinated effort to design a long term strategy for eliminating child lead poisoning in the state of Michigan, including a statewide assessment of old housing stock with lead hazards and areas with high incidence of child lead poisoning, analysis of current research on the incidence and impacts of lead paint in old homes, and a survey of current law, resources, and policy related to lead abatement and remediation;

NOW, THEREFORE, I, Richard D. Snyder, Governor of the state of Michigan, by virtue of the powers and authority vested in the Governor by the Michigan Constitution of 1963 and Michigan law, order the following:

I. CREATION OF THE MICHIGAN CHILD LEAD POISONING ELIMINATION BOARD

A. The Child Lead Poisoning Elimination Board (the "Board") is created as a temporary commission pursuant to Article V, Section 4 of the Constitution of the state of Michigan of 1963 and shall serve as an advisory body within the Executive Office of the Governor.

B. The Board shall be an independent and autonomous entity with the intent that its authority, powers, duties, and responsibilities be exercised free from the direction and supervision of the principal departments in the executive branch, and shall be composed of twelve (12) members appointed as follows:

1. The Lieutenant Governor.

2. The Governor shall appoint seven (7) members serving at the pleasure of the Governor.

3. The following four (4) department or authority directors, or their designee, from within their respective department or authority:

- The Department of Environmental Quality;
- The Department of Health and Human Services;
- The Department of Licensing and Regulatory Affairs; and
- The Michigan State Housing Development Authority.

C. A vacancy on the Board shall be filled in the same manner as the original appointment.

D. The Board shall include individuals with particular expertise in prevention and mitigation of child lead poisoning and may include representatives from pediatric hospitals, local units of government, relevant nonprofit agencies, local health departments, and education.

II. CHARGE TO THE BOARD

A. The Board shall act in an advisory capacity to the Governor and the state of Michigan, and make recommendations to the Governor concerning testing of children for elevated blood lead; follow-up monitoring and services, including case management; environmental lead investigations; remediation and abatement; and dashboards and reporting, including but not limited to the following:

1. Recommend changes to improve the blood lead testing rate of children in Michigan, especially in high-risk areas and for children under the age of six (6) years old.

2. Recommend changes to improve the percentage of families utilizing follow-up services when a child tests positive for elevated blood lead and ensure the adequacy of those services.

3. Recommend changes to improve the availability of environmental lead investigations to families when a child tests positive for elevated blood lead, particularly with respect to children under the age of six (6) years old, and ensure the adequacy of such investigations.

4. Recommend achievable improvements to current remediation and abatement efforts aimed at reducing child lead poisoning dangers throughout Michigan and in particular hotspots, including individual homes.

5. Recommend improvements to existing collection, maintenance, sharing, and reporting efforts regarding child lead poisoning data, including recommendations for the implementation of dashboards, websites, apps, and other means of conveying information.

B. The Board shall also inventory existing resources and programs that touch the above areas and make recommendations regarding coordination and supplementation where appropriate.

C. By November 4, 2016, the Board shall provide to the Governor a full, written report on its recommendations for items in Section II.A. and II.B. of this Order.

III. OPERATIONS OF THE BOARD

A. The Board shall be staffed by personnel from and assisted by state departments and agencies as directed by the Governor's Office.

B. The Lieutenant Governor shall serve as the Chairperson. The Lieutenant Governor may select from among the Board's members a Vice Chairperson to act as Chair in his absence.

C. The Board shall meet at the call of the Chairperson and as may be provided in procedures adopted by the Board. Meetings of the Board may be held anywhere within the state of Michigan.

D. The Board may establish workgroups or committees assigning Board members to and inviting public participation on these workgroups or committees as the Board deems necessary.

E. The Board may adopt, reject, or modify recommendations made by the workgroups or committees.

F. A majority of the voting members of the Board serving constitutes a quorum for the transaction of the Board's business notwithstanding the existence of one (1) or more vacancies. The Board shall act by majority vote of its present and voting members for the purpose of making recommendations to the Governor.

G. The Board may adopt procedures consistent with Michigan law and this Order governing its organization and operations.

H. The Board may, as appropriate, make inquiries, studies, investigations, hold hearings, and receive comments from the public. Subject to the Governor's approval, the Board

may consult with outside experts in order to perform its duties, including, but not limited to, experts in the private sector, government agencies, and the nonprofit sector.

I. Members of the Board shall serve without compensation. Subject to the Governor's approval and available funding, members of the Board may receive reimbursement for necessary travel and expenses according to relevant statutes and the rules and procedures of the Michigan Civil Service Commission and the Department of Technology, Management and Budget.

J. The Board may hire or retain contractors, sub-contractors, advisors, consultants, and agents, and may make and enter into contracts necessary or incidental to the exercise of the powers of the Board and the performance of its duties, as the Governor deems advisable and necessary in accordance with the relevant statutes, rules, and procedures of the Civil Service Commission and the Department of Technology, Management and Budget.

K. The Board may accept grants of funds, donations of funds, property, labor, services, or other things of value from any public or private agency or person. Any donations shall be expended in accordance with applicable laws, rules, and procedures.

L. Members of the Board, staff, or contractors shall refer all legal, legislative, and media contacts relating to Board actions or activities to the Office of the Governor.

IV. MISCELLANEOUS

A. All departments, committees, commissioners, or officers of this state or of any political subdivision of this state shall give to the Board, or to any member or representative of the Board, any necessary assistance required by the Board or any member or representative of the Board, in the performance of the duties of the Board so far as is compatible with its, his, or her duties.

B. Any suit, action, or other proceeding lawfully commenced by, against, or before any entity affected under this Order shall not abate by reason of the taking effect of this Order.

C. Nothing in this Order shall be construed to change the organization of the executive branch of state government or the assignment of functions among its units in a manner requiring the force of law.

D. The invalidity of any portion of this Order shall not affect the validity of the remainder of the Order.

E. The Board shall dissolve two years after the effective date of this Order.

This Executive Order shall become effective upon filing.

Given under my hand and the Great Seal of the state of Michigan this _____ day of May, in the Year of our Lord Two Thousand Sixteen.

_____

RICHARD D. SNYDER
GOVERNOR

BY THE GOVERNOR:

_____
SECRETARY OF STATE

EXECUTIVE ORDERS

EXECUTIVE ORDER
No. 2016 - 10

STATE OF ENERGY EMERGENCY
WAIVER OF REGULATIONS RELATING TO MOTOR CARRIERS AND DRIVERS TRANSPORTING PETROLEUM PRODUCTS

WHEREAS, Section 1 of Article V of the Michigan Constitution of 1963 vests the executive power of the state of Michigan in the Governor; and

WHEREAS, Section 3 of 1982 PA 191, MCL 10.83, and Executive Order No. 2015-10 (Section VIII) authorizes the Governor to declare a State of Energy Emergency upon notification of an impending energy emergency by the Executive Director of the Michigan Agency for Energy, or upon the Governor's own initiative, if the Governor finds that an energy emergency exists or is imminent; and

WHEREAS, the West Shore pipeline – a common carrier petroleum pipeline – from Milwaukee to Green Bay, Wisconsin has been shut down since March 10, 2016 for emergency repairs. This pipeline transports petroleum products to six Green Bay terminals where it is then loaded on tanker trucks and transported to fueling stations in the Upper Peninsula of Michigan. The shutdown of the pipeline has resulted in longer driving distances, wait times, and working hours for gasoline and other motor fuels transporters, causing drivers to reach maximum weekly driving and on-duty limits more quickly than normal; and

WHEREAS, this pipeline shutdown is affecting the availability of gasoline and other motor fuel supplies in most of the Upper Peninsula, creating temporary shortages and shipment delays that may potentially impact the health, safety, and economic well-being of the citizens of Michigan who depend on these products, and the ability of transporters to supply the products in accordance with federal motor carrier regulations and requirements; and

WHEREAS, additional infrastructure outages such as the temporary Marathon Refinery shutdown and the Alberta wildfires are aligning to cause tightening in the petroleum supply markets resulting in longer driving distances, crowded petroleum terminals, and extended wait times for motor fuels transporters in the Lower Peninsula; and

WHEREAS, it is in the best interests of the state of Michigan to provide for the safe transportation of gasoline and other motor fuels within this state, and that appropriate measures be taken in response to an imminent energy emergency to assure that gasoline and other motor fuels supplies will remain sufficient to protect the health, safety, and welfare of Michigan residents and visitors; and

WHEREAS, under Section 4 of 1982 PA 191, MCL 10.84, during a declared

State of Energy Emergency, the Governor may, by executive order, suspend a statute, order, rule of a state agency, or specific provision of a statute, rule, or order if strict compliance with the statute, order, rule, or a specific provision of the statute, rule, or order will prevent, hinder, or delay necessary action in coping with the energy emergency; and

WHEREAS, Federal Motor Carrier Safety Administration regulations found at 49 CFR 390.23, and Michigan Public Act 181 of 1963, MCL 480.11a, provide the Governor with the authority to exempt motor carriers and drivers transporting gasoline and other motor fuels within Michigan from the hours-of-service regulations and requirements specified in 49 CFR Part 395 and MCL 480.11a, to address transportation needs arising from the impact of this energy emergency;

NOW, THEREFORE, I, RICHARD D. SNYDER, Governor of the state of Michigan, by virtue of the power and authority vested in the Governor by the Michigan Constitution of 1963 and 1982 PA 191, MCL 10.81 to 10.87, order the following:

1. A State of Energy Emergency is declared in the state of Michigan.

2. Motor carriers and drivers transporting gasoline and other motor fuels to address the transportation and supply needs arising from the current emergency, are exempt from compliance with MCL 480.11a and any other applicable state statute, order, or rule substantially similar to MCL 480.11a, and 49 CFR Part 395. Any such provision of a state statute, order, or rule is suspended. This exemption and suspension applies to all highways in Michigan, including the national system of interstate and defense highways.

3. This Order applies only to gasoline and other transportation fuels. No other petroleum products are covered by the exemption and suspension under this Order.

4. No motor carrier or driver operating under the terms of this Order shall require or allow an ill or fatigued driver to operate a motor vehicle. Any driver who informs a carrier that he or she needs immediate rest shall be given at least ten consecutive off-duty hours before the driver is required to return to work.

5. Nothing in this Order shall be construed as an exemption from applicable controlled substances and alcohol use and testing requirements (49 CFR Part 382 and any similar state statute, order, or rule), the commercial driver's license requirements (49 CFR Part 383 and any similar state statute, order, or rule), the financial responsibility requirements (49 CFR Part 387 and any similar state statute, order, or rule), applicable size and weight requirements, or any portion of federal and state regulations not specifically identified.

6. Motor carriers or drivers currently subject to an out-of-service order are not eligible for the exemption and suspension until the out-of-service order expires or the conditions for rescission have been satisfied.

7. The Michigan Department of State Police requires that drivers for motor carriers operating under the Declaration of Energy Emergency must have a copy of the Declaration of Energy Emergency in their possession.

8. The Commercial Vehicle Enforcement Division of the Michigan Department of State Police shall coordinate state compliance with this Order.

This Order is effective upon filing and remains in effect until it is rescinded or 11:59:59 p.m. EDT, June 6, 2016, whichever first occurs.

Given under my hand and the Great Seal of the state of Michigan this _____ day of May, in the Year of our Lord Two Thousand Sixteen.

_____

RICHARD D. SNYDER
GOVERNOR

BY THE GOVERNOR:

_____

SECRETARY OF STATE

EXECUTIVE ORDERS

EXECUTIVE ORDER
No. 2016 - 11

MICHIGAN STATEWIDE INDEPENDENT LIVING COUNCIL
EXECUTIVE OFFICE OF THE GOVERNOR

RESCISSION OF
EXECUTIVE ORDERS 2007-49 AND 2012-15

WHEREAS, Section 1 of Article V of the Michigan Constitution of 1963 vests the executive power of the state of Michigan in the Governor; and

WHEREAS, Section 8 of Article V of the Michigan Constitution of 1963 provides that the Governor shall take care that the laws be faithfully executed; and

WHEREAS, many Michigan residents have one or more disabilities; and

WHEREAS, disability is a natural part of the human experience and in no way diminishes the right of an individual with a disability to live independently, enjoy self-determination, make choices, contribute to society, pursue a meaningful career, and enjoy full inclusion and integration in the economic, political, social, cultural, and educational mainstream of our society; and

WHEREAS, the state of Michigan shares the goals of the federal government of providing individuals with disabilities the tools necessary to make informed choices and decisions and to achieve equality of opportunity, full inclusion and integration in society, employment, independent living, and economic and social self-sufficiency; and

WHEREAS, under Section 705 of the Rehabilitation Act of 1973, as amended, 29 USC § 796d(a), to be eligible to receive federal assistance under Title VII of the Rehabilitation Act of 1973, as amended, a state must establish a statewide independent living council, which may not be established as an entity within a state agency; and

WHEREAS, Sections 474 and 475 of the Workforce Innovation and Opportunity Act, Public Law 113-128, have amended the Rehabilitation Act of 1973 to alter and expand the responsibilities of statewide independent living councils; and

WHEREAS, reestablishment of the Michigan Statewide Independent Living Council, organized under Executive Order 1994-23, then reestablished by Executive Order 2007-49, and amended by Executive Order 2012-15, is necessary to appropriately reflect the current organizational structure of state government and to comply with federal law; and

WHEREAS, reestablishment of the Michigan Statewide Independent Living Council will improve working relationships among entities providing services to individuals with disabilities, centers for independent living and the Michigan Statewide Independent Living Council;

NOW, THEREFORE, I, Richard D. Snyder, Governor of the state of Michigan, by virtue of the power and authority vested in the Governor by the Michigan Constitution of 1963 and Michigan law, order the following:

I. DEFINITIONS

A. "Center for independent living" means that phrase as defined under Section 702 of the Rehabilitation Act of 1973, as amended, 29 USC § 796a(2).

B. "Council" means the Michigan Statewide Independent Living Council created within the Executive Office of the Governor by this Order.

C. "Disability" means that term as defined under Section 7 of the Rehabilitation Act of 1973, as amended, 29 USC § 705(9).

D. “Designated State Entity” means that term as defined under Section 704 of the Rehabilitation Act of 1973, as amended, 29 USC § 796c(c). Until otherwise designated in the State Plan, Designated State Entity responsibilities in Michigan will lie with Michigan Rehabilitative Services and the Bureau of Services for Blind Persons.

E. "Independent living services" means that phrase as defined under Section 7 of the Rehabilitation Act of 1973, as amended, 29 USC § 705(18).

F. "Individual with a disability" means that phrase as defined under Section 7 of the Rehabilitation Act of 1973, as amended, 29 USC § 705(20).

G. "Michigan Rehabilitation Services" means the bureau within the Department of Health and Human Services that serves as the state general rehabilitation agency for individuals with disabilities, except those who are blind, and that is responsible for administration of the vocational rehabilitation program under the Rehabilitation Act of 1964, 1964 PA 232, MCL 395.81 to 395.90.

H. "Bureau of Services for Blind Persons" means the bureau created as a Type II agency within the Department of Licensing and Regulatory Affairs by Executive Order 2012-5, MCL 445.2033.

I. "Personal assistance services" means that phrase as defined under Section 7 of the Rehabilitation Act of 1973, Public Law 93-112, as amended, 29 USC § 705(28).

J. "State Plan" means the state plan for independent living jointly developed by the Council and centers for independent living as required by Section 704 of the Rehabilitation Act of 1973, as amended, 29 USC § 796c.

II. CREATION OF MICHIGAN STATEWIDE INDEPENDENT LIVING COUNCIL

A. The Michigan Statewide Independent Living Council is created within the Executive Office of the Governor.

B. The Council shall include sixteen (16) members that provide statewide representation, represent a broad range of individuals with disabilities from diverse backgrounds and are knowledgeable about centers for independent living and independent living services.

C. The Council shall include the following eleven (11) voting members appointed by the Governor after soliciting recommendations from representatives of organizations representing a broad range of individuals with disabilities and organizations interested in individuals with disabilities:

1. One director of a center for independent living chosen by the directors of centers for independent living within this state.

2. One individual representing parents or guardians of individuals with disabilities.

3. One individual representing advocates of, and for, individuals with disabilities.

4. One individual representing organizations that provide services for individuals with disabilities, including, but not limited to, private businesses.

5. Seven other residents of this state including residents who represent the underserved or tribal communities.

D. In addition to the voting members of the Council appointed under Section II.C., the Council shall include the following five (5) non-voting ex officio members:

1. The Director or designee of Michigan Rehabilitation Services.

2. The Director of designee of the Bureau of Services for Blind Persons.

3. A representative from the Michigan Department of Civil Rights, designated by the Director of the Michigan Department of Civil Rights, who works in the Division on Deaf, Deafblind and Hard of Hearing.

4. A representative from the Michigan Department Education, designated by the Superintendent of Public Instruction, who works in the Office of Special Education.

5. A representative from the Department of Health and Human Services, designated by the Director of the Department of Health and Human Services, with knowledge of all programs within the Department of Health and Human Services impacting individuals with disabilities.

E. Of the voting members of the Council initially appointed by the Governor under Section II.C., three (3) members shall be appointed for a term expiring on December 31, 2017, four (4) members shall be appointed for a term expiring on December 31, 2018, and the remaining four (4) members shall be appointed for a term expiring on December 31, 2019. After the initial appointments, members shall be appointed for terms of three (3) years.

F. A majority of the voting members of the Council must be individuals with disabilities, as defined by 34 CFR Part 364, and not employed by any state agency or center for independent living.

G. A vacancy on the Council occurring other than by expiration of a term shall be filled by the Governor in the same manner as the original appointment for the balance of the unexpired term. A vacancy shall not affect the power of the remaining members to exercise the duties of the Council.

H. No member of the Council appointed by the Governor under Section II.C. may serve more than two consecutive full terms.

III. CHARGE TO THE COUNCIL

A. The Council shall do all of the following:

1. Jointly develop and sign, in conjunction with the centers for independent living, along with Michigan Rehabilitation Services and Bureau of Services for Blind Persons acting as the Designated State Entities for the resource plan, the State Plan in compliance with Section 704 of the Rehabilitation Act of 1973, as amended, 29 USC § 796c.

2. Monitor, review, and evaluate the implementation of the State Plan.

3. Ensure that all regularly scheduled meetings of the Council are open to the public and that sufficient advance notice is provided.

4. Work with centers for independent living to coordinate services with public and private entities to improve services provided to individuals with disabilities.

5. Conduct resource development activities to support the Council and the provision of independent living services by centers for independent living.

6. Submit reports to the United States Department of Health and Human Services as the Administrator of the Administration for Community Living may reasonably request. Keep records, and provide access to the records, as the Administrator finds necessary to verify the reports. Copies of any reports submitted under this paragraph shall be transmitted to the Governor and the members of the Council.

7. Perform other functions, consistent with the mission of the Council and state and federal law.

IV. OPERATIONS OF THE COUNCIL

A. The Council shall select from among the voting members of the Council a member to serve as Chairperson of the Council and may select from among the voting members of the Council other officers as the Council deems necessary.

B. A majority of the voting members of the Council serving constitutes a quorum for the transaction of the Council's business. The Council shall act by a majority vote of the voting members of the Council serving.

C. The Council shall meet at the call of the Chairperson and as may be provided in procedures adopted by the Council.

D. The Council shall hold hearings and forums as the Council determines necessary to carry out the duties of the Council.

E. The Council shall prepare, in conjunction with the Designated State Entities, a resource plan for the provision of resources, including staff and personnel, as may be necessary and sufficient to carry out the State Plan, with funds made available under Title VII of the Rehabilitation Act of 1973, as amended, and under Section 110 of Rehabilitation Act of 1973, 29 USC § 730, consistent with Section 101(a)(18) of the Rehabilitation Act of 1973, 29 USC § 721(a)(18), and from other public and private sources. The resource plan shall, to the maximum extent possible, rely on the use of resources in existence during the period of implementation of the resource plan.

F. The Council shall supervise and evaluate staff and personnel performing duties for the Council under the resource plan adopted under Section IV.E. as may be necessary to carry out the functions of the Council under this Order.

G. While assisting the Council in carrying out its duties, staff and other personnel performing duties pursuant to the resource plan adopted under Section IV.E. shall not be assigned duties by any other agency or office of this state that would create a conflict of interest.

H. In accordance with federal law, the Council may use resources available under the resource plan adopted under Section IV.H. to (1) reimburse members of the Council for reasonable and necessary expenses of attending Council meetings or (2) pay compensation to a member of the Council, if such member is not employed or must forfeit wages from other employment, for each day the member is engaged in performing Council duties.

I. The Council may enter into agreements with state departments and agencies to assist the Council in the performance of its duties and responsibilities under this Order.

J. Subject to the Governor’s approval, the Council may hire or retain contractors, sub-contractors, advisors, consultants, and agents, and may make and enter into contracts necessary or incidental to the exercise of the powers of the Commission and the performance of its duties, as the Governor deems advisable and necessary in accordance with the relevant

statutes, rules, and procedures or the Civil Service Commission and the Department of Technology, Management and Budget.

K. The Council may accept donations of labor, services, or other things of value from any public or private agency or person.

L. All state departments and agencies shall cooperate, to their best ability, with the Council in the performance of its duties and responsibilities under this Order. The Council may request of state departments and agencies information and assistance as the Council requires in the performance of its duties and responsibilities under this Order.

M. Members of the Council and staff shall refer all legal, legislative, and media contacts relating to Council actions or activities to the Office of the Governor.

V. MISCELLANEOUS

A. Executive Order 2012-15 is rescinded. Executive Order 2007-49 is rescinded. Executive Order 1994-23, which was rescinded by Executive Order 2007-49, remains rescinded. Executive Order 1994-21, which was rescinded by Executive Order 1994-23, remains rescinded.

B. Any rules, orders, contracts, and agreements related to the Council lawfully in effect prior to the effective date of this Order shall continue to be effective until revised, amended, or repealed.

C. This Order shall not abate any suit, action, or other proceeding lawfully commenced by, against, or before any entity affected under this Order. Any suit, action, or other proceeding may be maintained by, against, or before the appropriate successor of any entity affected under this Order.

D. The invalidity of any portion of this Order shall not affect the validity of the remainder of the Order, which may be given effect without any invalid portion. Any portion of this Order found invalid by a court or other entity with proper jurisdiction shall be severable from the remaining portions of this Order.

This Order shall become effective upon filing.

Given under my hand and the Great Seal of the state of Michigan this _____ day of May, in the Year of our Lord Two Thousand Sixteen.

_____

RICHARD D. SNYDER
GOVERNOR

BY THE GOVERNOR:

_____
SECRETARY OF STATE

(2016 SESSION)

MCL 24.208 states in part:

"Sec. 8. (1) The Office of Regulatory Reform shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:

* * *

(i) Other official information considered necessary or appropriate by the Office of Regulatory Reform."

The following table cites administrative rules promulgated during the year 2000, and indicates the effect of these rules on the Michigan Administrative Code (1979 ed.).

MICHIGAN ADMINISTRATIVE CODE TABLE
(2015 RULE FILINGS)

R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue
29.1901	*	10	325.5005	*	10	325.5081	*	10
29.1902	*	10	325.5006	*	10	325.5087	*	10
29.1903	*	10	325.5007	*	10	325.5110	*	10
29.1904	*	10	325.5008	*	10	325.5111	R	10
29.1905	*	10	325.5009	*	10	325.5111a	R	10
29.1906	*	10	325.5010	*	10	325.5111b	R	10
29.1907	*	10	325.5011	*	10	325.5111c	R	10
29.1908	*	10	325.5012	*	10	325.5112	R	10
29.1921	*	10	325.5013	*	10	325.5113	R	10
29.1922	*	10	325.5014	*	10	325.5114	R	10
29.1923	*	10	325.5016	*	10	325.5115	R	10
29.1924	*	10	325.5017	*	10	325.5116	R	10
29.1931	*	10	325.5018	*	10	325.5117	R	10
29.1932	*	10	325.5019	*	10	325.5117	R	10
29.1933	*	10	325.5020	*	10	325.5121	R	10
29.1934	*	10	325.5031	*	10	325.5122	R	10
29.1907a	A	10	325.5033	*	10	325.5132	R	10
29.1909	R	10	325.5041	*	10	325.5148	R	10
125.651	R	4	325.5043	*	10	325.5149	R	10
125.652	R	4	325.5044	*	10	325.5181	R	10
125.653	R	4	325.5046	*	10	325.5182	R	10
125.654	R	4	325.5047	*	10	325.5183	R	10
206.28	A	8	325.5051	*	10	325.5184	R	10
281.700.3	*	4	325.5052	*	10	325.5185	R	10
325.1	*	2	325.5053	*	10	325.5186	R	10
325.2	*	2	325.5054	*	10	325.5187	R	10
325.3	*	2	325.5055	*	10	325.5188	R	10
325.4	*	2	325.5056	*	10	325.5189	R	10
325.2581	R	3	325.5057	*	10	325.5191	R	10
325.2583	R	3	325.5058	*	10	325.5192	R	10
325.2584	R	3	325.5059	*	10	325.5193	R	10
325.2586	R	3	325.5060	*	10	325.5194	R	10
325.2587	R	3	325.5061	*	10	325.5195	R	10
325.2588	R	3	325.5065	*	10	325.5196	R	10
325.2589	R	3	325.5066	*	10	325.5232	R	10
325.2590	R	3	325.5067	*	10	325.5256	R	10
325.2591	R	3	325.5071	*	10	325.5273	R	10
325.5002	*	10	325.5072	*	10	325.5274	R	10
325.5003	*	10	325.5073	*	10	325.5281	R	10
325.5004	*	10	325.5074	*	10	325.5282	R	10

(***** Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue
325.5285	R	10	325.5361	R	10	325.5438	R	10
325.5286	R	10	325.5362	R	10	325.5439	R	10
325.5287	R	10	325.5365	R	10	325.5440	R	10
325.5288	R	10	325.5366	R	10	325.5441	R	10
325.5289	R	10	325.5368	R	10	325.5442	R	10
325.5290	R	10	325.5371	R	10	325.5448	R	10
325.5291	R	10	325.5372	R	10	325.5449	R	10
325.5293	R	10	325.5373	R	10	325.5461	R	10
325.5294	R	10	325.5375	R	10	325.5462	R	10
325.5296	R	10	325.5376	R	10	325.5464	R	10
325.5297	R	10	325.5378	R	10	325.5465	R	10
325.5298	R	10	325.5379	R	10	325.5466	R	10
325.5299	R	10	325.5380	R	10	325.5468	R	10
325.5301	R	10	325.5381	R	10	325.5471	R	10
325.5302	R	10	325.5383	R	10	325.5474	R	10
325.5303	R	10	325.5384	R	10	325.5475	R	10
325.5305	R	10	325.5385	R	10	325.5482	R	10
325.5306	R	10	325.5386	R	10	325.5484	R	10
325.5307	R	10	325.5388	R	10	325.5485	R	10
325.5309	R	10	325.5389	R	10	325.5486	R	10
325.5311	R	10	325.5390	R	10	325.5487	R	10
325.5312	R	10	325.5391	R	10	325.5491	R	10
325.5315	R	10	325.5395	R	10	325.5492	R	10
325.5317	R	10	325.5396	R	10	325.5493	R	10
325.5321	R	10	325.5397	R	10	325.5494	R	10
325.5322	R	10	325.5401	R	10	325.5495	R	10
325.5323	R	10	325.5402	R	10	325.5501	R	10
325.5325	R	10	325.5403	R	10	325.5505	R	10
325.5331	R	10	325.5404	R	10	325.5506	R	10
325.5333	R	10	325.5405	R	10	325.5507	R	10
325.5337	R	10	325.5407	R	10	325.5508	R	10
325.5347	R	10	325.5409	R	10	325.5601	R	10
325.5348	R	10	325.5411	R	10	325.5601a	R	10
325.5351	R	10	325.5417	R	10	325.5602	R	10
325.5352	R	10	325.5418	R	10	325.5603	R	10
325.5353	R	10	325.5421	R	10	325.5605	R	10
325.5355	R	10	325.5422	R	10	325.5606	R	10
325.5357	R	10	325.5423	R	10	325.5607	R	10
325.5358	R	10	325.5425	R	10	325.5608	R	10
325.5359	R	10	325.5437	R	10	325.5609	R	10

(***** Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue
325.5610	R	10	325.5696	R	10	325.5214	*	10
325.5611	R	10	325.5697	R	10	325.5215	*	10
325.5612	R	10	325.5698	R	10	325.5216	*	10
325.5613	R	10	325.5701	R	10	325.5217	*	10
325.5626	R	10	325.5703	R	10	325.5218	*	10
325.5627	R	10	325.5705	R	10	325.5219	*	10
325.5628	R	10	325.5707	R	10	325.5220	*	10
325.5629	R	10	325.5709	R	10	325.5221	*	10
325.5630	R	10	325.5711	R	10	325.5222	*	10
325.5634	R	10	325.5713	R	10	325.5224	*	10
325.5635	R	10	325.5715	R	10	325.5225	*	10
325.5637	R	10	325.5717	R	10	325.5226	*	10
325.5655	R	10	325.5719	R	10	325.5227	*	10
325.5656	R	10	325.5721	R	10	325.5228	*	10
325.5657	R	10	325.5102	*	10	325.5229	*	10
325.5658	R	10	325.5117a	*	10	325.5230	*	10
325.5667	R	10	325.5118	*	10	325.5231	*	10
325.5668	R	10	325.5119	*	10	325.5233	*	10
325.5669	R	10	325.5120	*	10	325.5236	*	10
325.5674	R	10	325.5123	*	10	325.5237	*	10
325.5675	R	10	325.5124	*	10	325.5238	*	10
325.5676	R	10	325.5125	*	10	325.5239	*	10
325.5677	R	10	325.5131	*	10	325.5240	*	10
325.5678	R	10	325.5133	*	10	325.5241	*	10
325.5679	R	10	325.5141	*	10	325.5245	*	10
325.5681	R	10	325.5143	*	10	325.5246	*	10
325.5682	R	10	325.5144	*	10	325.5247	*	10
325.5683	R	10	325.5145	*	10	325.5250	*	10
325.5684	R	10	325.5146	*	10	325.5253	*	10
325.5685	R	10	325.5147	*	10	325.5255	*	10
325.5686	R	10	325.5201	*	10	325.5261	*	10
325.5687	R	10	325.5202	*	10	325.5262	*	10
325.5688	R	10	325.5203	*	10	325.5263	*	10
325.5689	R	10	325.5205	*	10	325.5264	*	10
325.5690	R	10	325.5206	*	10	325.5265	*	10
325.5691	R	10	325.5208	*	10	325.5266	*	10
325.5692	R	10	325.5210	*	10	325.5267	*	10
325.5693	R	10	325.5211	*	10	325.5268	*	10
325.5694	R	10	325.5212	*	10	325.5269	*	10
325.5695	R	10	325.5213	*	10	325.5270	*	10

(***** Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue
325.5271	*	10	325.52601	*	5	338.4973	*	6
325.5431	*	10	325.52602	*	5	338.4976	*	6
325.5432	*	10	338.1a	A	8	338.4978	*	6
325.5435	*	10	338.601	*	6	338.4982	*	6
325.5446	*	10	338.607	*	6	338.6103	A	8
325.5447	*	10	338.611	*	6	338.12001a	A	6
325.5450	*	10	338.613	*	6	338.13002	A	8
325.5452	*	10	338.617	*	6	339.14002	A	6
325.5454	*	10	338.619	*	6	400.5001	R	3
325.5455	*	10	338.621	*	6	400.5002	R	3
325.5481	*	10	338.623	*	6	400.5004	R	3
325.5511	*	10	338.602	A	6	400.5005	R	3
325.5021	R	10	338.604	A	6	400.5006	R	3
325.5049	R	10	338.627	A	6	400.5008	R	3
325.5060	R	10	338.629	A	6	400.5009	R	3
325.5061	R	10	338.641	A	6	400.5011	R	3
325.5065	R	10	338.645	a	6	400.5013	R	3
325.5066	R	10	338.647	A	6	400.5014	R	3
325.5067	R	10	338.649	A	6	400.5016	R	3
325.5071	R	10	338.609	R	6	400.5017	R	3
325.5072	R	10	338.625	R	6	400.5018	R	3
325.5073	R	10	338.1303	A	8	408.10702	A	5
325.5074	R	10	338.1751a	A	6	408.10711	*	5
325.5081	R	10	338.2201a	A	6	408.10712	*	5
325.5087	R	10	338.3113	*	8	408.10713	*	5
325.5110	R	10	338.3120	*	8	408.10727	*	5
325.52001	*	6	338.3121	*	8	408.10753	*	5
325.52002	*	6	338.3123	*	8	408.18502	*	5
325.52003	*	6	338.3125	*	8	408.18599	*	5
325.52005	*	6	338.3651	A	6	408.14016e	R	6
325.52008	*	6	338.3653	A	6	408.14017a	R	6
325.52011	*	6	338.3655	A	6	408.14018a	R	6
325.50251	*	5	338.3657	A	6	408.14019a	R	6
325.50252	*	5	338.3659	A	6	408.14019b	R	6
325.50253	*	5	338.3661	A	6	408.14019c	R	6
325.50254	*	5	338.3663	A	6	408.14020a	R	6
325.50255	*	5	338.3665	A	6	408.14021a	R	6
325.50256	*	5	338.3901a	A	6	408.14021b	R	6
325.50257	*	5	338.4971	*	6	408.14022a	R	6
325.50258	*	5	338.4972	*	6	408.14023a	R	6

(***** Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue
408.14024a	R	6	408.41006c	A	6	408.41053g	A	6
408.14025a	R	6	408.41006d	A	6	408.41054	A	6
408.14025b	R	6	408.41006e	A	6	408.41055	A	6
408.14026a	R	6	408.41007	A	6	408.41055a	A	6
408.14027a	R	6	408.41035	A	6	408.41055b	A	6
408.14028a	R	6	408.41035a	A	6	408.41055c	A	6
408.14029a	R	6	408.41035b	A	6	408.41056	A	6
408.14030a	R	6	408.41035c	A	6	408.41056a	A	6
408.14031a	R	6	408.41035d	A	6	408.41056b	A	6
408.14032a	R	6	408.41036	A	6	408.41056c	A	6
408.14033a	R	6	408.41036a	A	6	408.41056d	A	6
408.14034a	R	6	408.41036b	A	6	408.41056e	A	6
408.14041a	R	6	408.41036c	A	6	408.41056f	A	6
408.17405	*	8	408.41036d	A	6	408.41056g	A	6
408.17411	*	8	408.41037	A	6	408.41056h	A	6
408.17421	*	8	408.41037a	A	6	408.41056i	A	6
408.17422	*	8	408.41037b	A	6	408.41057	A	6
408.17423	*	8	408.41037c	A	6	408.41058	A	6
408.17424	*	8	408.41037d	A	6	408.41060	A	6
408.17426	*	8	408.41037e	A	6	408.41060a	A	6
408.17432	*	8	408.41037f	A	6	408.41060b	A	6
408.17433	*	8	408.41038	A	6	408.41060c	A	6
408.17434	*	8	408.41038a	A	6	408.41061	A	6
408.17435	*	8	408.41038b	A	6	408.41061a	A	6
408.17436	*	8	408.41038c	A	6	408.41061b	A	6
408.17437	*	8	408.41039	A	6	408.41061c	A	6
408.17440	*	8	408.41039a	A	6	408.41061d	A	6
408.17451	*	8	408.41039b	A	6	408.41061e	A	6
408.17461	*	8	408.41040	A	6	408.41061f	A	6
408.17463	*	8	408.41051a	R	6	408.41061g	A	6
408.41003a	*	6	408.41052	A	6	408.41062	A	6
408.41006a	*	6	408.41052a	A	6	408.41063	A	6
408.41001	A	6	408.41052b	A	6	408.41064	A	6
408.41003	A	6	408.41053	A	6	408.41065a	R	6
408.41003b	A	6	408.41053a	A	6	408.41066a	R	6
408.41003c	A	6	408.41053b	A	6	408.41067a	R	6
408.41003d	A	6	408.41053c	A	6	408.41068a	R	6
408.41003e	A	6	408.41053d	*	6	408.41069a	R	6
408.41006	A	6	408.41053e	*	6	408.41070a	R	6
408.41006b	A	6	408.41053f	A	6	408.41070b	R	6

(***** Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue	R Number	Action	2016 MR Issue
408.41071a	R	6	408.41085b	A	6	408.41016b	R	6
408.41072a	R	6	408.41085c	A	6	408.41016c	R	6
408.41073a	R	6	408.41085d	A	6	408.41016d	R	6
408.41074a	R	6	408.41085e	A	6	408.41501	A	6
408.41075a	R	6	408.41085f	A	6	408.41505	A	6
408.41080	A	6	408.41085g	A	6	408.41510	A	6
408.41080a	A	6	408.41085h	A	6	408.41515	A	6
408.41080b	A	6	408.41086	A	6	408.41520	A	6
408.41080c	A	6	408.41086a	A	6	408.41521	A	6
408.41080d	A	6	408.41086b	A	6	408.41522	A	6
408.41080e	A	6	408.41086c	A	6	408.41523	A	6
408.41080f	A	6	408.41086d	A	6	408.41524	A	6
408.41080g	A	6	408.41086e	A	6	408.41525	A	6
408.41080h	A	6	408.41086f	A	6	408.41526	A	6
408.41080i	A	6	408.41086g	A	6	408.41527	A	6
408.41080j	*	6	408.41087	A	6	408.41530	A	6
408.41080k	*	6	408.41088	A	6	408.41531	A	6
408.41080l	A	6	408.41089	A	6	408.41540	A	6
408.41080m	A	6	408.41090	A	6	408.41541	A	6
408.41080n	A	6	408.41090a	A	6	408.41542	A	6
408.41080o	A	6	408.41090b	A	6	408.41543	A	6
408.41081	A	6	408.41090c	*	6	408.41550	A	6
408.41082	A	6	408.41090d	*	6	408.41560	A	6
408.41082a	A	6	408.41090e	A	6	408.41561	A	6
408.41082b	A	6	408.41001a	R	6	408.41562	A	6
408.41082c	A	6	408.41004a	R	6	408.41563	A	6
408.41082d	A	6	408.41005a	R	6	408.41564	A	6
408.41082e	A	6	408.41008a	R	6	408.41570	A	6
408.41082f	A	6	408.41009a	R	6	408.41580	A	6
408.41082g	A	6	408.41009b	R	6	408.41590	A	6
408.41083	A	6	408.41011a	R	6	408.41595	A	6
408.41084	A	6	408.41011b	R	6	408.41605	*	4
408.41084a	A	6	408.41011c	R	6	408.41610	*	4
408.41084b	A	6	408.41011d	R	6	436.1311	R	4
408.41084c	A	6	408.41011e	R	6	484.71	*	8
408.41084d	A	6	408.41012a	R	6	484.72	*	8
408.41084e	A	6	408.41013a	R	6	484.73	*	8
408.41084f	A	6	408.41014a	R	6	484.74	*	8
408.41085	A	6	408.41015a	R	6	484.75	*	8
408.41085a	A	6	408.41016a	R	6	792.10101	*	5

(***** Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

R Number	Action	2016 MR Issue
792.11501	*	5
792.11503	R	5
792.11504	R	5
792.11505	R	5
792.11506	R	5
792.11507	R	5
792.11508	R	5
792.11509	R	5
792.1151	R	5
792.11511	R	5
792.11512	R	5
792.11513	R	5
792.11514	R	5
792.11515	R	5
792.11516	R	5
792.11517	R	5

(***** Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

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ADMINISTRATIVE RULES
ENROLLED SENATE AND HOUSE BILLS
SIGNED INTO LAW OR VETOED
(2015 SESSION)

Mich. Const. Art. IV, §33 provides: "Every bill passed by the legislature shall be presented to the governor before it becomes law, and the governor shall have 14 days measured in hours and minutes from the time of presentation in which to consider it. If he approves, he shall within that time sign and file it with the secretary of state and it shall become law . . . If he does not approve, and the legislature has within that time finally adjourned the session at which the bill was passed, it shall not become law. If he disapproves . . . he shall return it within such 14-day period with his objections, to the house in which it originated."

Mich. Const. Art. IV, §27, further provides: "No act shall take effect until the expiration of 90 days from the end of the session at which it was passed, but the legislature may give immediate effect to acts by a two-thirds vote of the members elected to and serving in each house."

MCL 24.208 states in part:

"Sec. 8. (1) The Office of Regulatory Reform shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:

* * *

(b) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills signed into law by the governor during the calendar year and the corresponding public act numbers.

(c) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills vetoed by the governor during the calendar year."

2016 Michigan Public Acts Table

Legislative Service Bureau
Legal Division, Statutory Compiling and Law Publications Unit
124 W. Allegan, Lansing, MI 48909

May 12, 2016

Through Act 116 of 2016

PA No.	ENROLLED HB	ENROLLED SB	I.E.* Yes/No	Governor Approved	Filed Date	Effective Date	SUBJECT
1	4983		Yes	1/26	1/26	4/25/16	***Natural resources**; fishing*; entrance into state-operated public boating access sites and certain state parks on free fishing weekends; allow free of charge. ***(Rep. B. Rendon)***
2	4604		Yes	1/26	1/26	2/25/16	***Natural resources**; soil and erosion*; soil erosion and sedimentation permit process; provide exemption for certain agricultural practices. ***(Rep. B. Roberts)***
3	5220		Yes	1/29	1/29	1/29/16	***Appropriations**; supplemental*; distribution of certain appropriated revenue from the state general fund to department of health and human services; provide for. ***(Rep. P. Phelps)***
4	4459		Yes	2/2	2/2	2/2/16	***Traffic control**; driver license*; emergency contact information encoded in driver license; allow. ***(Rep. P. Lucido)***
5	4460		Yes	2/2	2/2	2/2/16	***State**; identification cards*; emergency contact information on state identification card; provide for. ***(Rep. P. Lucido)***
6	4535		Yes	2/2	2/2	5/2/16	***Weapons**; licensing*; requirement to obtain a license to purchase, carry, possess, use, or transport a pistol; exempt law enforcement officers. ***(Rep. L. Theis)***
7		0232	Yes	2/2	2/2	2/2/16	***Use tax**; definitions*; definition of auto dealer; modify. ***(Sen. D. Robertson)***
8		0233	Yes	2/2	2/2	2/2/16	***Sales tax**; definitions*; definition of auto dealer; modify. ***(Sen. D. Robertson)***

* - I.E. means Legislature voted to give the Act immediate effect.
** - Act takes effect on the 91st day after sine die adjournment of the Legislature.
*** - See Act for applicable effective date.
\+ - Line item veto.
++ - Pocket veto.
\# - Tie bar.

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2016 Michigan Public Acts Table

PA No.	ENROLLED HB	ENROLLED SB	I.E.* Yes/No	Governor Approved	Filed Date	Effective Date	SUBJECT
9		0539	Yes	2/16	2/16	2/16/16	***Higher education**; financial aid*; promise zones; modify administration. ***(Sen. G. Hansen)***
10		0540	Yes	2/16	2/16	2/16/16 #	***Property tax**; state education tax*; distribution of state education tax; modify. ***(Sen. J. Ananich)***
11	5023		Yes	2/16	2/16	5/16/16	***Natural resources**; other*; dark sky preserves; expand locations. ***(Rep. P. Pettalia)***
12		0328	Yes	2/16	2/16	5/16/16	***Law enforcement**; state police*; grade and duties of state law enforcement officers; modify. ***(Sen. T. Schuitmaker)***
13		0303	Yes	2/16	2/16	5/16/16	***Cemeteries and funerals**; other*; investment of money in a perpetual care and maintenance fund; expand authority. ***(Sen. M. Knollenberg)***
14		0394	Yes	2/16	2/16	5/16/16	***Housing**; inspection*; multi-unit inspections; make discretionary unless complaint is received and include certain townships within scope of act. ***(Sen. D. Robertson)***
15		0615	Yes	2/16	2/16	2/16/16	***Civil procedure**; remedies*; judgments against municipalities that are collected as tax levies; prohibit transmission or capturing by other governmental entity. ***(Sen. W. Schmidt)***
16	4455		Yes	2/23	2/23	5/23/16	***Highways**; bridges*; bridge inspection process; modify. ***(Rep. B. Glardon)***
17	5070		Yes	2/23	2/23	5/23/16	***Labor**; health and safety*; franchisee and franchisor responsibility as employer under the Michigan occupational safety and health act; clarify. ***(Rep. E. Leutheuser)***
18	5071		Yes	2/23	2/23	5/23/16	***Labor**; hours and wages*; employer responsibility for employees; allocate between franchisor and franchisee. ***(Rep. P. Somerville)***

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2016 Michigan Public Acts Table

PA No.	ENROLLED HB	ENROLLED SB	I.E.* Yes/No	Governor Approved	Filed Date	Effective Date	SUBJECT
19	5072		Yes	2/23	2/23	5/23/16	***Labor**; hours and wages*; franchisor responsibility for minimum wage violations; clarify. ***(Rep. N. Jenkins)***
20	5073		Yes	2/23	2/23	5/23/16	***Employment security**; employers*; franchisee and franchisor responsibility for contributions and benefits; clarify. ***(Rep. D. Garcia)***
21		0513	Yes	2/23	2/23	2/23/16	***Highways**; name*; renaming a bridge on US-10; designate as the "Corpsman Aaron D. Ullom Memorial Bridge". ***(Sen. J. Stamas)***
22	4853		Yes	2/23	2/23	5/23/16	***Vehicles**; motorcycles*; fee for motorcycle safety course; modify. ***(Rep. J. Tedder)***
23	4854		Yes	2/23	2/23	5/23/16	***Vehicles**; motorcycles*; waiver of certain test requirements for individuals who complete a motorcycle safety course; provide for. ***(Rep. J. Tedder)***
24		0136	Yes	2/26	2/26	2/26/16	***Appropriations**; zero budget*; supplemental appropriations; provide for fiscal year 2015-2016. ***(Sen. D. Hildenbrand)***
25	4888		Yes	3/1	3/1	5/30/16	***Property tax**; other*; assessment roll; allow assessor to maintain electronically. ***(Rep. H. Hughes)***
26		0503	Yes	3/1	3/1	5/30/16	***Children**; adoption*; Michigan Indian family preservation act (MIFPA); modify. ***(Sen. J. Emmons)***
27	4758		Yes	3/1	3/1	3/1/16	***Drains**; financing*; term bonds with mandatory redemption; provide for. ***(Rep. A. Pscholka)***
28	4727		Yes	3/1	3/1	5/30/16	***Aeronautics**; other*; regulations for tall structures; revise for meteorological towers. ***(Rep. T. Cole)***

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\# - Tie bar.

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PA No.	ENROLLED HB	ENROLLED SB	I.E.* Yes/No	Governor Approved	Filed Date	Effective Date	SUBJECT
29		0554	Yes	3/8	3/8	6/6/16	***Health**; occupations*; use of electronic continuing education tracking services; allow. ***(Sen. T. Schuitmaker)***
30		0555	Yes	3/8	3/8	6/6/16	***Occupations**; individual licensing and regulation*; use of electronic continuing education tracking services; allow. ***(Sen. T. Schuitmaker)***
31		0056	Yes	3/8	3/8	3/8/16	***Courts**; judges*; salary formula for judges; modify. ***(Sen. R. Jones)***
32		0176	Yes	3/8	3/8	6/6/16 #	***Crimes**; intoxication or impairment*; oversight for ignition interlock servicing centers; provide for department of state. ***(Sen. T. Schuitmaker)***
33		0357	Yes	3/8	3/8	6/6/16 #	***Occupations**; vehicles, dealers and repair facilities*; breath alcohol ignition interlock mechanics and servicers; include in motor vehicle service and repair act. ***(Sen. T. Schuitmaker)***
34	4980		Yes	3/8	3/8	6/6/16 #	***Criminal procedure**; sentencing guidelines*; guidelines for crime of knowingly providing false information concerning an ignition interlock device; revise. ***(Rep. K. Kesto)***
35		0334	Yes	3/8	3/8	3/8/16	***Children**; protection*; reporting child abuse or child neglect through an online reporting system and waiving a written report under certain circumstances; allow, change venereal disease to sexually transmitted infection, and allow federal or state governmental agency access to certain records. ***(Sen. J. Emmons)***
36		0588	Yes	3/8	3/8	6/6/16	***Natural resources**; hunting*; certain tribal conservation officers; authorize to demand hunting, fishing, or fur harvester's licenses. ***(Sen. T. Casperson)***
37		0680	Yes	3/8	3/8	3/8/16	***Mental health**; other*; naming the new patient programming center at the Walter P. Reuther Psychiatric Hospital the "James K. Haveman Center for Activity, Rehabilitation, and Therapy"; provide for. ***(Sen. P. MacGregor)***
38		0150	Yes	3/15	3/15	3/15/16	***Insurance**; health insurers*; health plans that provide prescription drug coverage; clarify requirements for synchronizing multiple prescriptions and dispensing fees. ***(Sen. M. O'Brien)***

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39		0051	Yes	3/15	3/15	6/13/16	***Highways**; name*; renaming a portion of highway in Genesee County; designate as "John Wayne "Dusty" Marcum Memorial Highway". ***(Sen. K. Horn)***
40		0444	Yes	3/15	3/15	6/13/16	***Health**; emergency services*; critical incident stress management services for emergency service providers; provide for, prohibit disclosure of confidential communications, and provide immunity from liability. ***(Sen. J. Stamas)***
41		0471	Yes	3/15	3/15	6/13/16	***Courts**; district court*; sixty-seventh district; clarify fourth division jurisdiction. ***(Sen. D. Robertson)***
42		0472	Yes	3/15	3/15	6/13/16	***Taxation**; tobacco*; tobacco product manufacturers' escrow accounts act; modify. ***(Sen. W. Schmidt)***
43		0473	Yes	3/15	3/15	6/13/16	***Tobacco**; generally*; tobacco products tax act; require certain enforcement disclosures. ***(Sen. P. MacGregor)***
44		0578	Yes	3/15	3/15	6/13/16	***Consumer credit**; predatory lending*; mortgage borrowers' bill of rights; modify to refer to federal home loan publications. ***(Sen. D. Booher)***
45		0644	Yes	3/15	3/15	3/15/16	***Businesses**; nonprofit corporations*; authorization to restructure municipal health facilities corporations; revise requirements. ***(Sen. J. Stamas)***
46	4314		Yes	3/15	3/15	6/13/16	***Traffic control**; violations*; operation of a motor vehicle on property open to public in a manner that would be a moving violation if on public property causing death or serious impairment of a body function; prohibit, and provide penalties. ***(Rep. S. Singh)***
47	4408		Yes	3/15	3/15	6/13/16 #	***Health occupations**; veterinarians*; veterinarian continuing education requirement; modify, and include veterinary technicians and a license cycle for veterinarian and veterinary technician licenses. ***(Rep. K. Crawford)***
48	4458		Yes	3/15	3/15	6/13/16	***Transportation**; other*; complete streets advisory council; eliminate. ***(Rep. J. Runestad)***

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2016 Michigan Public Acts Table

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49	4999		Yes	3/15	3/15	6/13/16 #	***Health**; pharmaceuticals*; dispensing prescription drug or device requirements; expand to include an out-of-state veterinary prescriber, and amend certain other provisions relating to veterinary licensing. ***(Rep. E. McBroom)***
50	5105		No	3/15	3/15	**	***Insurance**; health insurers*; health insurance claims assessment on carriers and third party administrators; modify sunset. ***(Rep. A. Pscholka)***
51	4887		Yes	3/22	3/22	3/22/16	***Individual income tax**; other*; limitations on investment direction of contributions made to a Michigan education savings account; modify. ***(Rep. A. Forlini)***
52	4747		Yes	3/22	3/22	6/20/16	***Property**; other*; adverse possession; prohibit against local units of government. ***(Rep. H. Hughes)***
53	5385		Yes	3/29	3/29	3/29/16 #	***State financing and management**; authorities*; Michigan financial review commission; expand to include certain education districts. ***(Rep. E. Poleski)***
54	5296		Yes	3/29	3/29	3/29/16	***Appropriations**; zero budget*; supplemental appropriations for distressed public schools; provide for fiscal year 2015-2016. ***(Rep. A. Pscholka)***
55		0507	Yes	3/29	3/29	6/27/16	***Environmental protection**; recycling*; registration and reporting requirements; establish for recyclers of material from residential and commercial waste. ***(Sen. M. Green)***
56		0216	Yes	3/29	3/29	6/27/16	***School aid**; other*; certain references to general education development (GED); modify. ***(Sen. D. Robertson)***
57		0551	Yes	3/29	3/29	6/27/16	***Probate**; wills and estates*; designation of a funeral representative to make disposition arrangements for decedent; provide for. ***(Sen. T. Schuitmaker)***
58	4577		Yes	3/29	3/29	3/29/16	***Traffic control**; driver license*; renewal of unexpired seasonal restricted commercial driver licenses; allow. ***(Rep. D. Lauwers)***

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59	5034		Yes	3/29	3/29	6/27/16	***Probate**; wills and estates*; fiduciary access to digital assets act; enact. ***(Rep. A. Forlini)***
60	4792		Yes	3/29	3/29	6/27/16	***Health occupations**; health care professionals*; authorized health professionals from other states accompanying athletic teams to sporting events in this state; provide licensing waiver. ***(Rep. R. Wittenberg)***
61	5377		Yes	4/5	4/5	4/5/16	***Appropriations**; supplemental*; Michigan natural resources trust fund; provide appropriations for fiscal year 2015-2016. ***(Rep. J. Bumstead)***
62	5107		Yes	4/5	4/5	7/4/16	***Law enforcement**; other*; human trafficking notification act; create. ***(Rep. K. Heise)***
63		0374	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references to venereal disease; revise to sexually transmitted infection. ***(Sen. C. Hertel)***
64		0375	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references of venereal disease; revise to sexually transmitted infection. ***(Sen. P. MacGregor)***
65		0376	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references of venereal disease; revise to sexually transmitted infection. ***(Sen. D. Knezek)***
66		0377	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references of venereal disease; revise to sexually transmitted infection. ***(Sen. W. Schmidt)***
67		0378	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references of venereal disease; revise to sexually transmitted infection. ***(Sen. M. O'Brien)***
68		0379	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references of venereal disease; revise to sexually transmitted infection. ***(Sen. R. Warren)***

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69		0380	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references of venereal disease; revise to sexually transmitted infection. ***(Sen. J. Marleau)***
70		0381	Yes	4/5	4/5	7/4/16 #	***Health**; code*; references of venereal disease; revise to sexually transmitted infection. ***(Sen. C. Young)***
71		0592	Yes	4/5	4/5	4/5/16	***Health facilities**; other*; designated places to perform surgical removal of a human organ; expand. ***(Sen. C. Hertel)***
72	4418		Yes	4/5	4/5	7/4/16	***Traffic control**; traffic regulation*; maple sap transport; include in agricultural commodities for exemption from seasonal road restrictions. ***(Rep. L. Chatfield)***
73	4813		Yes	4/5	4/5	7/4/16	***Occupations**; electricians*; number of apprentice electricians a journeyman or master electrician may supervise on a jobsite; revise. ***(Rep. A. Price)***
74	5006		Yes	4/5	4/5	7/4/16	***Highways**; name*; certain portion of Business Route I-96; designate as the "Lansing Firefighter Dennis E. Rodeman Memorial Highway". ***(Rep. T. Cochran)***
75	4537		Yes	4/5	4/5	7/4/16	***Labor**; fair employment practices*; employee absence from work to provide emergency civil air patrol services; protect from adverse employment action. ***(Rep. A. LaFontaine)***
76	5192		Yes	4/5	4/5	7/4/16	***Occupations**; accounting*; practice of public accounting; revise scope of practice. ***(Rep. C. Afendoulis)***
77		0729	Yes	4/12	4/12	4/12/16	***Transportation**; funds*; counties to provide loans to townships for purpose of funding township road construction projects; allow. ***(Sen. W. Schmidt)***
78		0171	Yes	4/12	4/12	7/11/16	***Property tax**; exemptions*; housing exemption for elderly or disabled families; modify. ***(Sen. S. Bieda)***

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79		0366	Yes	4/12	4/12	7/11/16	***Records**; public*; solicitation of a fee for providing a copy of a deed; regulate. ***(Sen. C. Hertel)***
80		0502	Yes	4/12	4/12	7/11/16	***Health**; pharmaceuticals*; health care false claims act; modify exemption to exempt certain payments from drug manufacturers to certain persons for certain health care services. ***(Sen. J. Marleau)***
81		0667	Yes	4/12	4/12	4/12/16	***Liquor**; advertising*; providing advertising items to retailers; modify. ***(Sen. J. Stamas)***
82		0582	Yes	4/12	4/12	4/12/16	***Property tax**; delinquent taxes*; issuance of revenue notes secured by the collection of delinquent taxes by a county treasurer; allow. ***(Sen. J. Brandenburg)***
83		0583	Yes	4/12	4/12	4/12/16	***State financing and management**; bonds*; requirement for a county treasurer to issue revenue notes secured by delinquent tax revenues; provide for. ***(Sen. J. Brandenburg)***
84	4895		Yes	4/12	4/12	7/11/16	***Liquor**; licenses*; secondary location permit to sell beer and wine at retailers with motor fuel pumps; provide for. ***(Rep. A. Nesbitt)***
85		0352	Yes	4/13	4/13	7/12/16	***Health**; home health care*; designated caregiver act; create. ***(Sen. M. O'Brien)***
86		0476	Yes	4/19	4/19	4/19/16	***Taxation**; tobacco*; tobacco products act; eliminate sunset related to tax on cigars. ***(Sen. W. Schmidt)***
87	4479		Yes	4/26	4/26	7/25/16	***Crimes**; assaultive*; assault or battery of a pregnant woman; increase penalties under certain circumstances. ***(Rep. A. Price)***
88	4788		Yes	4/26	4/26	7/25/16 #	***Criminal procedure**; sentencing guidelines*; sentencing guidelines for crime of assault and battery of a pregnant individual; provide for. ***(Rep. A. Price)***

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89		0508	Yes	4/26	4/26	7/25/16	***Crimes**; other*; intentional posting of sexually explicit visual material of another person without consent; prohibit. ***(Sen. S. Bieda)***
90		0509	Yes	4/26	4/26	7/25/16 #	***Crimes**; penalties*; penalties for intentionally posting sexually explicit visual material of another person without consent; provide for. ***(Sen. R. Jones)***
91	4477		Yes	4/26	4/26	7/25/16	***Civil procedure**; appeals*; service of papers; provide for alternate service if party is protected by a protective order. ***(Rep. K. Kesto)***
92		0490	Yes	5/2	5/2	7/31/16	***Trade**; business practices*; provisions relating to the disclosure of customer information under video rental privacy statute; modify. ***(Sen. T. Schuitmaker)***
93	4476		Yes	5/3	5/3	8/1/16	***Civil procedure**; other*; mediation; limit in certain domestic relations actions. ***(Rep. H. Santana)***
94	4478		Yes	5/3	5/3	8/1/16	***Civil procedure**; personal protection orders*; acts that may be enjoined; include harming animals owned by petitioner. ***(Rep. R. Kosowski)***
95	4480		Yes	5/3	5/3	8/1/16	***Children**; protection*; factors determining best interest of child; modify in cases of domestic violence. ***(Rep. K. Heise)***
96	4481		Yes	5/3	5/3	8/1/16	***Family law**; child custody*; custody or parenting time for certain parents of a child conceived through sexual assault or sexual abuse; prohibit under certain circumstances. ***(Rep. L. Lyons)***
97	4660		Yes	5/3	5/3	8/1/16	***Insurance**; health insurers*; reporting requirements for health maintenance organizations' enrollment levels; eliminate. ***(Rep. T. Leonard)***
98	4661		Yes	5/3	5/3	8/1/16 #	***Insurance**; other*; medical malpractice report related to assumed liability to pay a claim; eliminate. ***(Rep. L. Theis)***

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99	4662		Yes	5/3	5/3	8/1/16	***Insurance**; other*; reporting requirements for state of competition in the commercial liability insurance market; eliminate. ***(Rep. H. Vaupel)***
100	4663		Yes	5/3	5/3	8/1/16	***Insurance**; other*; reporting requirements for short-term limited duration policies; modify. ***(Rep. J. Runestad)***
101	4664		Yes	5/3	5/3	8/1/16	***Insurance**; other*; reporting requirement for competition in the worker's compensation market; eliminate. ***(Rep. R. Franz)***
102	4665		Yes	5/3	5/3	8/1/16 #	***Insurance**; other*; municipal claims report; eliminate. ***(Rep. R. Wittenberg)***
103	4666		Yes	5/3	5/3	8/1/16 #	***Insurance**; other*; reference municipal claims report; eliminate. ***(Rep. D. Miller)***
104	4667		Yes	5/3	5/3	8/1/16 #	***Insurance**; other*; reporting requirement for liquor liability insurance; eliminate. ***(Rep. R. Kosowski)***
105	4668		Yes	5/3	5/3	8/1/16 #	***Insurance**; other*; waiver of proof of financial responsibility filing requirement for retail licensees; eliminate. ***(Rep. A. LaFontaine)***
106	5257		Yes	5/3	5/3	8/1/16	***Liquor**; advertising*; social media promotions; define and allow. ***(Rep. K. Kesto)***
107	5525		Yes	5/5	5/6	5/6/16	***Property tax**; special assessments*; state essential services assessment act; modify filing requirements. ***(Rep. A. Nesbitt)***
108	5526		Yes	5/5	5/6	5/6/16	***Property tax**; exemptions*; general property tax act; modify filing requirements. ***(Rep. J. Farrington)***

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109	5545		Yes	5/5	5/6	5/6/16	***Property tax****; special assessments*; alternative state essential services assessment act; modify filing requirements. ***(Rep. J. Farrington)***
110	5527		Yes	5/5	5/6	5/6/16	***Economic development****; plant rehabilitation*; certain filing requirements; modify. ***(Rep. J. Farrington)***
111	4187		Yes	5/10	5/10	8/8/16	***Crimes****; malicious destruction*; vandalizing, desecrating, or intentionally destroying certain public property on a highway, freeway, or interstate road; prohibit, and provide penalties. ***(Rep. F. Durhal)***
112		0331	Yes	5/10	5/10	8/8/16	***Businesses****; distributors and dealers*; used motor vehicle parts dealers; require certain forms of payment for used tires, wheels, and rims. ***(Sen. R. Jones)***
113	4793		Yes	5/10	5/10	8/8/16	***Mental health****; code*; confidentiality of filing petitions for involuntary hospitalization; require. ***(Rep. P. Lucido)***
114	4636		Yes	5/10	5/10	8/8/16	***Occupations****; insurance*; sale of insurance for self-service storage units; eliminate license requirement. ***(Rep. B. Rendon)***
115	5278		Yes	5/10	5/10	5/10/16	***Drains****; financing*; incomplete drain improvement; specify types of costs that can be apportioned. ***(Rep. B. Glardon)***
116	5163		Yes	5/10	5/10	8/8/16	***State financing and management****; funds*; urban land assembly act; repeal, and transfer any remaining funds into the Michigan land bank. ***(Rep. K. Heise)***

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