

SECTION ONE – ENVIRONMENTAL REGULATIONS

CHAPTER 10: Radioactive Materials Regulations

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Purpose and Applicability of Regulations

Many facilities use radioactive material (RAM) in diverse ways or have radioactive wastes. For example, exit signs may contain tritium and smoke detectors may contain americium. Other examples of industrial uses of RAM include devices to measure the density of concrete or blacktop, determine the thickness of paper and rolled steel as it is made, find cracks in pipes or airplane surfaces, test the amount of lead in paint, or monitor the flow of sludge through pipes at a sewage treatment plant. Research facilities and academic institutions use RAM during the development of new pharmaceuticals to “tag” certain molecules to follow their progress through chemical or biological processes and in other research activities. Medical facilities inject patients with RAM to diagnose medical conditions and for therapeutic treatments. Medical facilities also use large radiation sources for cancer treatment. Radium paint was once used on aircraft instruments, naval compasses, military vehicle instruments, and on clocks and watches to make the numbers and lines glow in the dark. Pictures of some radioactive devices are at www.deq.state.mi.us/documents/deq-dwrpd-rad-radioactive_materials.pdf.



Naturally occurring radioactive material is found as uranium in clay and bricks, granite, shale, or other rocks. It is also found as radium in soils or as radium sulfate scales on some pipes and fittings from the oil and gas industry and as the naturally radioactive constituent of potassium, potassium-40. Natural gas and products derived from natural gas, such as propane, contain radon-222. When radon-222 decays, lead-210 can plate out on the interior of pipes and process equipment.

Agencies and Their Laws and Rules

Several state and federal agencies regulate the possession, use, transport, transfer, and disposal of radioactive material. The purpose of these requirements is to ensure the safe use and disposal of radioactive material. Some of these requirements, including the applicable regulatory agencies include:

- The [U.S. Nuclear Regulatory Commission](#) (NRC) regulates the use of source, byproduct, and special nuclear material under the authority of the U.S. Atomic Energy Act. These regulations are published under Title 10, Parts 1 through 171 of the Code of Federal Regulations ([10 CFR Parts 1 - 171](#)).
- The Department of Environmental Quality (DEQ), [Radiological Protection Program \(RPP\)](#) registers the possession and use of certain diffuse forms of naturally occurring radioactive material (NORM) under the authority of Public Health Code, Public Act 368 of 1978, as amended (Act 368).
- The [U.S. Department of Transportation](#) and [Michigan State Police, Commercial Vehicle Enforcement Division](#) oversee transportation of radioactive material under Title 49 of the Code of Federal Regulations (49 CFR). See Chapter 4.4 for more information about the transportation of radioactive materials.
- The Michigan [Department of Licensing and Regulatory Affairs, Radiation Safety Program](#), is responsible for the registration and inspection of medical (x-ray and mammography machines) and non-medical radiation machines and facilities. Call 517-284-7820 for more information.

10.1 Environmental Monitoring and Radon Gas

The [Environmental Monitoring Program](#) operates an environmental monitoring network around each of Michigan's nuclear power plant sites. The program collects and analyzes several types of samples, including direct radiation, air, surface water, precipitation, and milk from the environs of the nuclear plants. Unit laboratory analyses also include samples collected by other program staff during investigations of potentially contaminated sites, during emergency response activities, and from routine staff compliance investigations.

The DEQ's [Indoor Radon Program](#) conducts activities under the U.S. Environmental Protection Agency's (U.S. EPA's) State Indoor Radon Grant Program. This program provides education on the radiological risks posed by public exposure to radon gas and works closely with local health departments throughout the state for outreach at the local level.

Radon Information - www.michigan.gov/radon | radon@michigan.gov | 800-723-6642.

10.2 Nuclear Facilities

The [Radiological Emergency Preparedness \(REP\) Program](#) is responsible, in part, for Michigan's Radiological Emergency Preparedness program. The REP Unit develops and implements the DEQ's Nuclear Facilities Emergency Management Plan. These efforts are conducted in cooperation with other state and federal agencies and are overseen by the Michigan State Police. REP Unit staff also interacts with nuclear plant utility staff and staff of the NRC concerning the

day-to-day operations of nuclear power reactors to ensure radiological protection of the public and the environment. Go to www.michigan.gov/radon and select “Radiological Emergency Preparedness” on the left for more information related to radiological emergency preparedness.

10.3 Radioactive Materials in the Environment

Radioactive materials occur naturally in our environment. These materials can be concentrated by certain industrial processes, like drilling for the production of oil, gas, and brine. Municipal drinking and waste water treatment systems can also have radium on their production equipment, in sludges, and in solid residuals. The Radiological Protection Program works with other DEQ staff to monitor and evaluate the public health and environmental consequences of these naturally occurring radioactive materials. Radiological Protection Program staff identifies and coordinates remediation of radioactively contaminated sites and works with other state and federal agencies to assure proper site cleanup and disposition of contaminated materials.

10.3.1 NRC Licensing

The U.S. Nuclear Regulatory Commission regulates source, byproduct, and special nuclear material. It also regulates nuclear power plants and high level radioactive waste storage and disposal. The Region III office near Chicago, Illinois, can be contacted at 800-522-3025.

10.4 Emergency Assistance

Program staff responds to radiation alarm trips at scrap metal facilities and landfills and to citizen concerns and complaints regarding radioactive materials. During normal business hours, please contact the [Radiological Protection Program](#) at 517-284-5185 regarding any radiation emergency or for questions about radioactive material. Off-hour radiation emergencies can be reported through the DEQ Pollution Emergency Alerting System (PEAS) hotline at 800-292-4706 or by contacting the Michigan State Police Operations Center at 517-241-8000. A facility must also meet the emergency reporting requirements of other federal or state agencies for hazardous or radioactive material. Radiological Protection Program staff are trained and equipped with radiation detection instrumentation to act as first responders to radiation emergencies 24 hours a day, seven days a week.

10.5 Radioactive Waste Disposal

Discuss disposal options for radioactive wastes with the Radiological Protection Program staff by calling 517-284-5185.

10.5.1 Tritium Exit Signs

Do NOT landfill exit signs that contain tritium. These should be returned to the manufacturer, if possible, or properly disposed by a licensed radioactive waste disposal contractor. A label should be on the signs giving proper disposal directions. These exit signs, disposal contractors, and disposal sites are regulated under [10 CFR by the NRC](#).

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The shipping requirements for these exit signs are regulated under the [US. Department of Transportation regulations in 49 CFR](#). Contact the shipping companies for their specific policies and contact the Michigan State Police, [Commercial Vehicle Enforcement Division](#) with shipping questions.

See Chapter 30 regarding MIOASHA regulations that require exit signs in buildings. For information on [disposal of exit signs](#), go to www.michigan.gov/radon, “Radioactive Material,” go to the U.S. EPA’s site at www.trainex.org/web_courses/tritium/index.htm.

10.5.2 Waste Industrial Smoke Detectors

Remove any batteries from the detector and handle the battery as a universal waste or under the applicable hazardous waste regulations for that company’s hazardous waste generator status (see Chapter 2).

The requirement a company must follow depends on whether the smoke detector contains radioactive material or if it could be considered a hazardous waste. There are two types of materials commonly found in smoke detectors.

- The older models may contain a non-exempt radium-226 source that is regulated by the U.S. Nuclear Regulatory Commission. These detectors should not go to a solid waste landfill but be returned to the manufacturer or disposed as radioactive waste.
- Newer models may contain a small americium-241 source. The combined smoke detector and americium source are specifically exempted in the federal regulations allowing homeowners to dispose individual detectors in a sanitary landfill. Large quantities, such as those collected during a major construction renovation or hazardous waste collection project should not be disposed without first checking with officials of the NRC or [Radiological Protection Program](#) staff.

Some smoke detectors could be subject to the hazardous waste regulations because the amount of metal in the detectors may fail the Toxicity Characteristic Leaching Procedure. Small quantity generators and large quantity generators cannot put hazardous waste smoke detectors in the trash. Conditionally exempt small quantity generators may dispose smoke detectors in licensed solid waste landfills if the landfill will accept them and they do not contain radioactive materials above exempt quantities. However, if smoke detectors are not classified as a hazardous waste and do not contain radioactive materials above exempt quantities, then they may be sent to a licensed landfill. Companies should contact the landfill if disposing of large numbers (roughly around 25 or so) because the waste load may set off the landfill’s radiation detectors. Smoke detectors should not be recycled for metal or incinerated.

Contact the DEQ, [Radiological Protection Program](#) regarding potential safety concerns when numerous smoke detectors are disposed of at the same time or regarding nuclear regulations.

WHERE TO GO FOR HELP

SUBJECT: State and Federal Radioactive Material Regulations

CONTACT: DEQ, Radioactive Materials Program
517-284-5185
RadioactiveMaterial@Michigan.govwww.michigan.gov/radon
("Radioactive Materials")

PUBLICATIONS: 1. [Ionizing Radiation Rules for Radioactive Material](#)
2. Cleanup and Disposal Guidelines for Sites Contaminated with Radium-226 ([EQC 1602](#))

SUBJECT: Radon Gas in Indoor Air (Naturally Occurring)

CONTACT: DEQ, Indoor Radon Program
Radon@michigan.gov
800-723-6642
www.michigan.gov/deqradon

SUBJECT: Registration and Inspection of Radiation Machines

CONTACT: DLARA, MIOSHA-Radiation Safety Program
517-284-7820
RSSInfo@michigan.gov
www.michigan.gov/miosha (select "Radiation Safety.")

SUBJECT: U.S. DOT Hazardous Materials Transportation

CONTACT: U.S. Department of Transportation
800-467-4922 or 517-853-5990
www.phmsa.dot.gov

Michigan State Police, Commercial Vehicle Enforcement Division
517-241-0506
www.michigan.gov/msp

Michigan Center for Truck Safety
800-682-4682
www.truckingsafety.org