MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
MATERIALS MANAGEMENT DIVISION

EGLE

Information for Educators Notice: Potential Safety Hazard

Radioactive Materials in Educational Institutions

Radioactive materials and radioactivity are all around us at very low levels. Most of our exposure to radioactivity is part of the natural environment. Low-hazard radioactive materials are common in household products, as well, from smoke alarms to antique glassware. Nevertheless, we should take reasonable steps to reduce unnecessary exposures to radioactivity.

Many high schools and colleges in Michigan may possess radioactive materials and sources acquired many years ago that are no longer being used. The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Materials Management Division (MMD), will assist schools in identifying these items and advising on storage or disposal options.

The Problem

Staff from the MMD's Radiological Protection Section (RPS) have conducted radiation surveys at many educational institutions. Some schools have radioactive materials acquired many years ago, usually as unregulated items, without records of safety requirements for use or disposal. Although radioactive materials may be properly stored and used, we have found radioactive material sources that were damaged, leaking, improperly stored or labeled, and unidentified as radioactive. In some cases, a potential radioactive material contamination hazard was evident. The areas most likely to pose these problems include physics and chemistry labs, offices and storerooms, hazardous materials storage rooms, and ceramics work areas and classrooms. Often these radioactive materials were in storage for years, and current staff were not aware of their radioactive properties. These instances present unnecessary and avoidable radiation exposure hazards.

Current regulations on storage, packaging, shipping, and disposal may be much more extensive than when the schools acquired the radioactive materials. Some materials may require disposal in a licensed radioactive waste disposal facility.

It is important to note that we are not aware of any incident within Michigan schools that has caused a significant radiological exposure to students or staff. We are issuing this notice to alert schools concerning the potential for a hazard and to help assure that such an incident will not take place.

Radioactive Materials That May Be in Educational Settings

The MDEQ regulates naturally occurring and accelerator produced radioactive material. The United States Nuclear Regulatory Commission (NRC) regulates byproduct, source, and special nuclear material.

Sealed Sources

Many sources found in educational institutions are exempt quantity sealed sources used for demonstration or equipment calibration purposes. These often present an insignificant hazard. Exempt sources should not be in direct contact with the skin for extended periods and should not be handled if the source appears damaged. Damaged sealed sources and improperly sealed liquids or precipitate residues from chemical experiments using unsealed radioactive material can pose contamination and exposure hazards. Sources manufactured 30 or more years ago may have deteriorated to a point that source integrity may be uncertain.

Uranium and Thorium Compounds

Uranium oxide was commonly used to color ceramics. Uranium oxide is usually in the form of a fine powder that can present potential inhalation, ingestion, and contamination hazards. Exposure also can result from holding a jar or bag of the material for an extended period of time. Uranium oxides and acetates are usually of high enough concentration to be considered generally licensed by the NRC. Uranium nitrate was used as a component of the toners and intensifiers for developing photographs. Uranium acetate and uranium nitrate were used during the staining process for electron microscope slides. Uranium ore can also be found in schools. Thorium nitrate was used for solution color change demonstrations in chemistry classes. Thorium oxides were also commonly available for study in natural science classes. All these sources were often acquired with minimal information describing potential radiation hazards.

Radium

Radium is a naturally occurring radioactive material that was used in fluorescent paint for luminous aircraft instruments, clock faces, and compasses. Radium can also be found as a check source for radiation detectors. Radium decays into radon and other radioactive matter. Except for intact watches and clocks, no item containing radium is exempt from state regulatory requirements.

Removable radium-impregnated foils were also used in the following Mettler balances:

Model B-5	Serial numbers 7500-14231
Model B-5 GD	Serial numbers 7500-14491
Model B-6	Serial numbers 7500-15821
Type M	Serial numbers 5451-5900
Type M	Serial numbers 17001-105047

Many radium sources were manufactured and distributed before the promulgation of radiation protection standards.

Gamma Irradiators

Gamma irradiators were designed to irradiate materials for educational demonstrations and laboratory experiments. In the 1960s, the United States Department of Energy distributed gamma irradiators to high schools. A common device was the Radiation Machinery Corporation Model RAMCO-50-ORNL. Isomedix, Inc., Nordion, Inc., and Atomic Energy of Canada, Ltd, also manufactured gamma irradiators. These devices can pose significant radiation hazards and now require a specific license from the NRC.

Pictures of some common radioactive sources can be viewed at the following link:

http://www.deq.state.mi.us/documents/deq-dwrpd-rad-radioactive_materials.pdf

Response

The MMD will perform radiation surveys and consultation at secondary schools and small colleges for the safe handling of unwanted radioactive materials. The goal is to reduce the possibility of unnecessary radiation exposures and to assure the proper storage or disposal of the materials.

We recommend that educational facilities evaluate their inventory of materials to determine if radioactive materials are present. If so, determine if the materials are properly labeled and stored, if the materials are possessed under appropriate regulatory authorization (through the U.S. Nuclear Regulatory Commission or EGLE), if the sources are leaking or visibly damaged, or if potentially contaminated areas exist.

Contact the RPS or a qualified radiological consultant if any of the following conditions apply:

- You possess radioactive materials that are no longer used or wanted.
- You possess radioactive materials and are unsure of the current safety or regulatory requirements that apply.
- You need assistance in identifying or finding radiation sources or assistance in contamination control.
- You have a gamma irradiator containing cesium-137.

Please contact us if you have any questions, comments, or additional concerns regarding this matter.

Michigan Department of Environment, Great Lakes, and Energy
Materials Management Division
Radiological Protection Section
P.O. Box 30241
Lansing, Michigan 48909
Telephone: 517-284-6581
FAX: 517-335-0564
E-mail: RadioactiveMaterial@michigan.gov