

## MONITORING FOR RADIOACTIVE MATERIAL IN SOLID WASTE

### Radiation...It's part of our everyday lives

Every day, people are exposed to naturally occurring radiation. Small amounts of radioactivity are in the air we breathe, the soil, and our bodies. Radiation plays an important and sometimes vital role in our everyday lives.

The sun, stars, and other cosmic sources constantly emit radiation that enters the earth's atmosphere. Natural radiation can also originate from potassium, which can be found in living cells, and from uranium, a common radioactive element found in soil, rocks, and minerals.

Radiation consists of invisible energy waves or particles that originate from natural and non-natural radioactive materials. Although natural and non-natural radiation are controlled and regulated differently, both sources of radiation behave identically and can be detected with the same instruments.

All material or matter found in nature is made of atoms, which can be either stable or unstable. As unstable atoms change or decay to become stable, they give off their excess energy as radiation. In addition to radiation originating from natural radioactive sources, artificial or non-natural radiation can be produced by high voltage devices such as X-ray equipment. Non-natural radioactivity is used in many consumer products and in various medical and research applications. Self-luminescent exit signs, watches, and smoke detectors are only a few of the many products that contain or emit low levels of radioactivity and radiation. Radiation is also an essential element used in cancer treatment, diagnostic X-rays, and other medical procedures and research.



Radioactive Consumer Products

With so many uses and applications for radiation available today, it's not surprising that radiation is a part of everyday life. Items containing radioactive material must be carefully used and disposed of to prevent unintended hazards.

### DEP Requires Monitoring for Radioactive Material

In 2000, the Department of Environmental Protection (DEP) developed regulations and guidance for radioactive material that may be found in waste and represent a common-sense approach for identifying, managing, and disposing of waste containing certain types of radioactive material. DEP's regulations do not allow the disposal of radioactive material regulated under a state or federal license, which must be disposed of at a properly licensed low-level radioactive waste disposal site, such as the facilities located in Utah, Texas, or Washington.

According to the regulations, all solid waste disposal facility operators must install equipment at their facilities that will scan incoming waste and sound an alarm if radioactivity is detected. The types of facilities required to monitor waste include transfer stations, resource recovery facilities, and landfills. When the alarm is triggered, the operator must follow specific guidelines to ensure the radioactive material detected is properly identified and managed.

Most of the alarms sounded at solid waste facilities in the state have involved radioactive material that decays rapidly, does not jeopardize human health or the environment, and can be safely disposed of in a landfill. This includes waste contaminated with radioactive material from animals or humans that have undergone a nuclear medicine procedure. Such material has included contaminated household products and even kitty litter.

## Guidelines for Waste Disposal

Depending upon the type of radioactive material detected in the waste stream, the facility operator must follow strict guidelines to ensure that the radioactive material is properly managed. Transfer stations and resource recovery recycling facilities that detect radioactive materials in their waste will evaluate this material. Only material that DEP allows for disposal may be transported to the landfill. However, the radioactive material must first be evaluated by the original facility per DEP-approved procedures prior to allowing it to be transported on a public roadway. DEP guidelines prompt two basic levels of response when radioactive material is detected.

### Action Level One Scenario

Under an Action Level One Scenario, an alarm would sound at a solid waste disposal facility indicating the presence of radioactive material in the incoming waste. The facility operator must then determine the cause of the alarm, identify the type of radioactive material present, and proceed with the facility's proper course of action. DEP may allow the waste to be disposed of at the solid waste facility if the radioactivity in the solid waste is from the undisturbed natural environment, contaminated waste from a medical patient that will decay rapidly, or an exempt consumer item.



Examples of waste containing radioactive material under an Action Level One Scenario may include solid waste from a patient's home, technologically enhanced naturally occurring radioactive material (TENORM) from oil and gas operations, or consumer products such as smoke detectors. Disposal of TENORM waste must meet DEP acceptance criteria. All radioactive material accepted by the solid waste facility for disposal must be managed according to specific DEP regulations in a manner that is protective of the public and the environment.

### Action Level Two Scenario

Although less likely, it is possible that radioactive sources of a more serious nature may become mixed with municipal or residual solid waste. If the vehicle radiation or contamination levels exceed pre-determined values (2 mrem/h in the cab or 50 mrem/h on the vehicle surface over background), the facility operator must follow guidelines for an Action Level Two Scenario. Under this scenario, an operator is not permitted to process or dispose of the solid waste and must contact DEP immediately. A radiological health physicist will respond to the facility or site and ensure that the radioactive material is properly identified, handled, and returned to the point of origin or disposed of at a licensed low-level radioactive waste disposal facility.

If solid waste material is licensed or under specific control by any state or federal agency, regardless of radiation levels associated with it, prior approval by DEP is required before it may be disposed of in Pennsylvania.

To learn more about the safe disposal of waste containing radioactive material, contact:

DEP's Bureau of Radiation Protection  
P.O. Box 8469  
Harrisburg, PA 17105-8469  
Office: 717-787-2480  
Fax: 717-783-8965

For more information, visit [www.dep.pa.gov](http://www.dep.pa.gov).