

Byproduct Materials

The Nuclear Regulatory Commission's mission is to ensure radioactive materials are used safely. The NRC and its predecessor, the Atomic Energy Commission, have regulated the use of radioactive materials since 1946. "Byproduct material," one type that the NRC regulates, has commercial, medical and academic uses.



Gauges measure the flow of liquid through a pipe

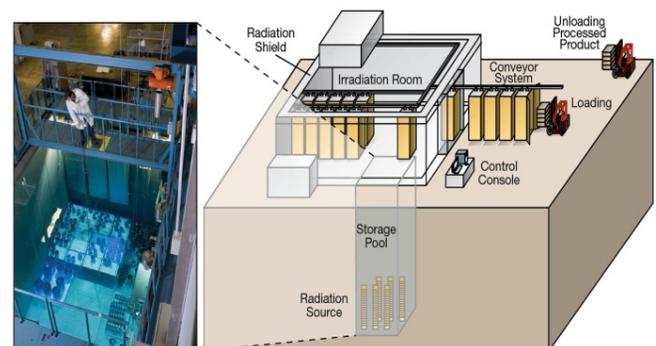
There are four categories of byproduct material:

1. Radioactive material that results from the fissioning, or splitting apart, of enriched uranium or plutonium in nuclear reactors. Examples include cobalt-60, cesium-137 and iridium-192.
2. Tailings or waste produced by processing uranium or thorium from ore.
3. Certain processed radium-226 or material that becomes radioactive in a particle accelerator used for a commercial, medical or research activity. Examples include fluorine-18, cobalt-57 and iodine-123.
4. A naturally occurring radioactive source that is processed to increase its concentration and that the Commission decides could pose a threat to people and the environment similar to that of radium-226.

Uses of Byproduct Materials

Licensees use byproduct materials in civilian and military work. They are used in industrial radiography, gauging devices and well logging. The public also uses them in products such as smoke detectors, some exit signs, static eliminators and some luminous watch dials. Medical licensees use byproduct materials in more than 20 million procedures each year. They help diagnose and treat patients in hospitals, clinics or physicians' offices. Colleges, universities and other institutions use byproduct materials in course work and research.

Commercial Irradiator



Irradiators sterilize medical equipment or eliminate pests from food

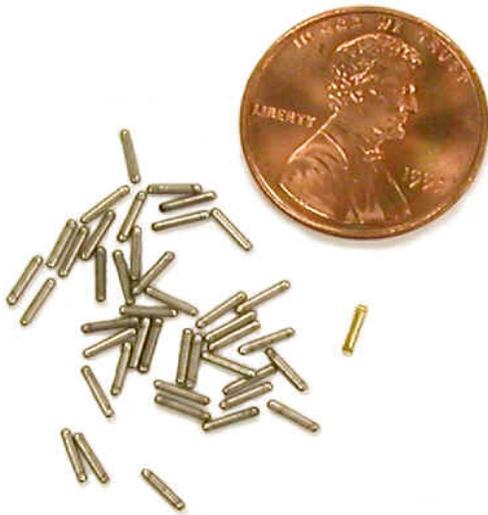
Security

Following the terrorist attacks of Sept. 11, the NRC increased [security requirements](#) for the most radioactive byproduct materials. First, the agency issued orders to licensees. It later formalized the requirements in a new regulation, [10 CFR Part 37](#), published in March 2013. Security measures include background checks, personnel access controls, security barriers, unauthorized access detection and an armed law enforcement response. The NRC and state regulators conduct periodic inspections to make sure licenses are meeting these requirements.



Radiography cameras spot cracks in metal or pipe welds

Regulating Byproducts



Iodine-125 and palladium -103 in implantable seeds are mainly used to treat prostate cancer

Source: Oak Ridge Associated Universities

licensees each year. Agreement States administer about 86 percent of materials licenses.

Byproduct materials are regulated by the NRC and 37 states that have signed agreements with the NRC giving them that authority. Known as [Agreement States](#), these states issue licenses and regulate about 18,000 materials licensees. The NRC also has authority over security, import and export, and exempt distribution of consumer products—allowing their use without requiring a specific NRC license.

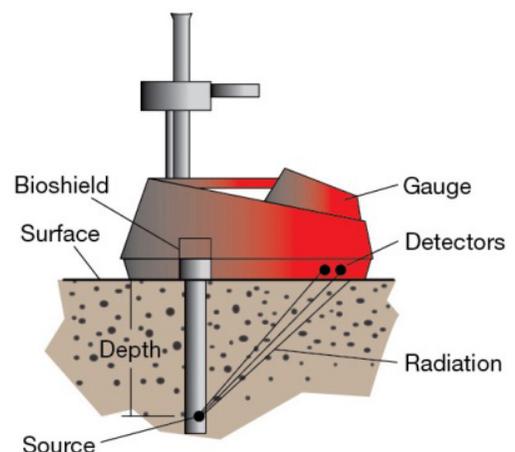
The NRC regulates byproduct material use in 13 non-Agreement States, the District of Columbia, Puerto Rico and other U. S. territories. The NRC also regulates its use by federal licensees in all states. Currently, the NRC oversees about 2,850 byproduct material licenses. Each year, the NRC reviews about 1,300 materials licensing actions, including new applications, amendments to existing licenses, license renewals, and sealed source and device reviews. The NRC inspects about 1,000 materials

The NRC conducts most of its materials licensing and inspection activities from its regional offices. At NRC headquarters, the Office of Federal and State Materials and Environmental Management Programs oversees that program and provides technical support and guidance. The office periodically evaluates the technical adequacy, consistency and timeliness of both the regional and state programs to ensure they protect health and safety.

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Moisture Density Gauge

Direct Transmission



Portable gauges measure ground moisture or density