



# BACKGROUND

Office of Public Affairs

301.415.8200



[www.nrc.gov](http://www.nrc.gov) ■ [opa.resource@nrc.gov](mailto:opa.resource@nrc.gov)

## Radium

Radium was one of the first radioactive elements ever discovered. Marie and Pierre Curie unlocked the atom's secrets in 1898, opening the door for important innovations using radioactivity in medicine and industry. Radiation quickly became a consumer and medical sensation and radium was the poster child. Experts concluded radiation was a lifesaver after finding it reduced tumor growth and was present in the waters at some health spas. Soon there were many radium products on the market that purported to improve health and vitality. But tragic stories began to emerge of radium's health impacts. Perhaps the most well-known is the story of the "radium girls" — factory workers who, in the 1920s, painted watch faces with glow-in-the-dark radium paint and developed infections and jaw cancer from licking their brushes into fine points.

### Early regulation

When evidence of harm began to emerge in the early 1900s, the states each made their own decisions about how to regulate radium. Courts also took varying approaches on victim compensation. The federal government acted to guard against false advertising and regulate mail shipments, conducted studies, and organized some voluntary protections.

As radioactive materials became more widely available following World War II, they remained largely under state control. Radium use declined in medical and consumer products in favor of other, safer materials.

### Regulation today

Work on securing radioactive materials took on new urgency following the terrorist attacks on the United States in September 2001. Those attacks prompted the International Atomic Energy Agency to develop a code of conduct in 2004 to limit the potential for malicious acts. That code places one form of radium, known as radium-226, and other radioactive materials into categories based on their quantity and potential hazard.

The NRC has specific security requirements tied to these categories. As support for the IAEA code grew, Congress passed the Energy Policy Act of 2005, giving the NRC authority over radium-226. This law marked the first time the federal government had a comprehensive role in ensuring the safe use of radium-226.

Many states had developed strong programs for regulating radium and other naturally occurring radioactive materials and it took time to transition authority to the NRC. The NRC had regulations in

place and fully assumed oversight in 2009. States that regulate radioactive materials under agreements with the NRC, known as Agreement States, retained their authority over radium.

Initially, NRC staff worked exclusively with the military to identify sites where radium might be present. These discussions made clear that the NRC's role would include ensuring that military sites where radium was used are maintained in a way that protects public health and safety.

In 2016, the NRC and Department of Defense signed a [Memorandum of Understanding](#) describing roles in the cleanup of radium and other unlicensed radioactive materials at military sites. The MOU and a [Regulatory Issue Summary](#) clarify NRC's jurisdiction over military radium. In late 2016, the NRC began monitoring two sites under the MOU: Treasure Island Naval Station in San Francisco and Dugway Proving Ground in Utah. Since then, the DoD has continued to identify additional sites, which the NRC has begun monitoring.

In 2013, the agency learned of two commercial sites where radium-226 had been found and other federal agencies had gotten involved. The Environmental Protection Agency was overseeing the Waterbury Clock Company in Connecticut. The National Park Service was overseeing Great Kills Park in New York.

NRC staff is working with the current owner of the Waterbury Clock Company site. Contaminated areas of the site are being evaluated by the EPA for possible listing on the Superfund program's National Priorities List. NRC staff is working with EPA to clarify oversight roles and responsibilities.

In 2018, NRC staff signed an MOU with the National Park Service that clarifies the NRC's jurisdiction over radium at Great Kills Park. Since then, the agencies have included additional parks in New York under the MOU following discovery of radium at those sites. The NRC is monitoring cleanup activities that the Park Service is implementing under Superfund, more formally known as the Comprehensive Environmental Response, Compensation and Liability Act.

The Waterbury Clock Company and Great Kills Park sites prompted a search to identify sites in NRC's jurisdiction where radium was used, and to find out how much, if any, cleanup was done. This search was not a result of any known health and safety issues. Rather, because of its mandate to protect public health and safety, the NRC wanted to be sure there were no additional sites that might pose a risk.

With the help of the Oak Ridge National Laboratory, the NRC began to develop a fuller picture of commercial radium use. The lab produced a catalog of the various products developed and sold to the public in the early 20<sup>th</sup> century. By reviewing publicly available records, Oak Ridge identified sites where radium may have been used to make consumer goods. Then the lab looked for any cleanup records. Oak Ridge transmitted the results to the NRC in November 2015.

Between 2017 and 2019, the NRC worked with the Oak Ridge Associated Universities to survey the commercial sites where radium contamination was considered likely. Five sites were determined to require cleanup to meet the NRC's public health and safety standards. All the sites that need cleanup are associated with former clock company factories in Connecticut.

Going forward, the NRC is focused on working with the current owners and state and local governments to clean up these contaminated commercial sites. As of September 2020, two have been

cleaned up adequately to ensure public health and safety are protected, and cleanup is continuing at the others. The NRC is also supporting Agreement States to ensure possibly contaminated sites in their jurisdictions do not pose a risk to public health and safety.

More information about this program can be found on the NRC's [radium website](#).

**September 2020**