



## Radiation Protection

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# Radiation Glossary Q-R

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## Q

### Qualitative Risk Assessment

a broad general analysis to determine whether a more extensive analysis is necessary. It essentially answers the question "safe or unsafe". (See also quantitative risk assessment)

### Quality Factor (Q)

The factor by which the absorbed dose (rad) is multiplied to obtain a quantity that expresses, on a common scale for all ionizing radiation, the biological damage (rem) to an exposed individual. It is used because some types of radiation, such as alpha particles, are more biologically damaging internally than other types.

## Reference Information

People and Discoveries  
Commonly Encountered  
Radionuclides

Americium-241  
Cesium-137  
Cobalt-60  
Iodine-129 &-131  
Plutonium  
Radium  
Radon  
Strontium-90  
Technetium-99  
Tritium  
Thorium  
Uranium

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### Quantitative Risk Assessment

a detailed analysis that provides a numerical probability that a particular kind of injury will occur (for example, the number of additional cases of cancer in a group of 10,000). (See also qualitative risk assessment)

## R

### Rad

(See Roentgen Absorbed Dose)

### Radiation (ionizing)

energy given off as either particles or rays from the unstable nucleus of an atom

Why Are Some Atoms Radioactive?  
This page explains radioactive atoms.

Can Unstable Atoms Become Stable?  
This link explains unstable atoms.

### **Radiation Protection Guide (RPG)**

radiation dose which should not be exceeded without careful consideration for doing so; every effort should be made to encourage the maintenance of radiation doses as far below this guide as practicable

### **Radiation Sickness (syndrome)**

the set of symptoms that results when the whole body (or a large part of it) has received an exposure of greater than 50 rads of ionizing radiation. The earliest symptoms are nausea, fatigue, vomiting, and diarrhea. Hair loss, hemorrhaging, inflammation of the mouth and throat, and general loss of energy may follow. If the exposure has been approximately 1,000 rad or more, death may occur within two to four weeks.

Radiation Health Effects  
This page describes the effects of both long-term and acute exposure to radiation.

### **Radiation Warning Symbol**

an officially prescribed symbol (a magenta or black trefoil) on a yellow background. It must be displayed where certain quantities of radioactive materials are present or where certain doses of radiation could be received.



Symbols in Radiation Protection  
This page provides definitions and images of radiation symbols.

### **Radioactive Contamination**

a deposit of radioactive material in any place where it may harm persons, equipment, or the environment.

### **Radioactive Decay**

The process in which an unstable (radioactive) nucleus emits radiation and changes to a more stable isotope or element. A number of different particles can be emitted by decay. The most typical are alpha or beta particles.

Can Unstable Atoms Become Stable?  
This link explains unstable atoms.

### **Radioactivity**

spontaneous transformation of the nucleus of an atom; this resulting in a new element, generally with the emission of alpha or beta particles often accompanied by gamma rays

### **Radiogenic**

caused by exposure to ionizing radiation

**Radioassay**

a test to detect and determine the amount of radioactive materials present that emit ionizing radiation. It will detect transuranic nuclides, uranium, fission and activation products, naturally occurring radioactive material and medical isotopes.

**Ionizing and Non-ionizing Radiation**  
This page explains ionizing and non-ionizing radiation.

**Radiography**

using radiation sources to "photograph" internal structures, such as turbine blades in jet engines. A sealed radiation source, usually iridium-192 or cobalt-60, beams gamma rays at the object to be checked. Gamma rays passing through flaws in the metal or incomplete welds strike special photographic film (radiographic film) on the opposite side. The process is very similar to taking an x-ray to check for broken bones.

**Radioisotope**

isotopes of an element that have an unstable nucleus. Radioactive isotopes are commonly used in science, industry, and medicine. The nucleus eventually reaches a more stable number of protons and neutrons through one or more radioactive decays. Approximately 3,700 natural and artificial radioisotopes have been identified.

**What is an Atom?**  
This page describes and explains atoms.  
**Nuclides & Isotopes**  
This page describes the distinctions between nuclides and isotopes.  
**Radionuclides**  
This page provides a list of fact sheets on commonly encountered radionuclides.

**Radionuclide**

an unstable form of a nuclide

**Nuclides & Isotopes**  
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This page provides a list of fact sheets on commonly encountered radionuclides.

**Radium**

Radium is a naturally-occurring radioactive metal. Radium is a radionuclide formed by the decay of uranium and thorium in the environment. It occurs at low levels in virtually all rock, soil, water, plants, and animals. Radon is a decay product of radium.

**Radium**  
This fact sheet describes the basic properties and uses,

and the hazards associated with this radionuclide. It also discusses radiation protection related to it.

**RadNet**

a nationwide system of air, water, and milk sampling stations that monitor radiation in the environment

**RadNet**

This page provides information about different RadNet sampling programs.

**Radon**

Radon is a naturally occurring radioactive gas found in soils, rock, and water throughout the U.S. Radon causes lung cancer, and is a threat to health because it tends to collect in homes, sometimes to very high concentrations. As a result, radon is the largest source of exposure to naturally occurring radiation.

**Resource Conservation and Recovery Act**

RCRA gives EPA the authority to control hazardous waste from cradle-to-grave. This includes the minimization, generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous solid wastes. RCRA focuses only on active and future facilities and does not address abandoned or historical sites, which are regulated under the Comprehensive Environmental Restoration, Cleanup, and Liability Act (CERCLA)

**Release Criterion**

a regulatory limit expressed in terms of dose or risk.

**Residual Radioactivity**

radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the cognizant organization's control. This includes radioactivity from all sources used by the cognizant organization, but excludes background radioactivity as specified by the applicable regulation or standard. It also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of 10 CFR Part 20.

**Risk**

the probability of injury, disease, or death under specific circumstances. Risk can be expressed as a value that ranges from zero (no injury or harm will occur) to one hundred percent (harm or injury will definitely occur). Risk-based standards limit the risk that releasing a contaminant to the environment may pose rather than limiting the quantity that may be released.

absolute risk, the excess risk attributed to irradiation and usually expressed as the numeric difference between irradiated and non-irradiated populations (e.g., 1 case of cancer per million people irradiated annually for each rad). Absolute risk may be given on an annual basis or lifetime basis.

relative risk, the ratio between the number of cancer cases in the irradiated population to the number of cases expected in the unexposed population. A relative risk of 1.1 indicates a 10 percent increase in cancer due to radiation, compared to the "normal" incidence.

**Risk Assessment**

an evaluation of the risk to human health or the environment by hazards. Risk assessments may look at either existing hazards or potential hazards. The assessment may be quantitative or qualitative.

**Roentgen (R)**

<http://www.epa.gov/rpdweb00/glossary/termqr.html#q>

Last updated on Thursday, March 24, 2011

a unit of exposure to ionizing radiation. It is an indication of the strength of the ionizing radiation. One Roentgen is the amount of gamma or x-rays needed to produce ions carrying 1 electrostatic unit of electrical charge in 1 cubic centimeter of dry air under standard conditions.

**Roentgen Absorbed Dose (rad)**

a basic unit of absorbed radiation dose. It is being replaced by the 'gray,' which is equivalent to 100 rad. One rad equals the dose delivered to an object of 100 ergs of energy, per gram of material.

**Roentgen Equivalent Man (rem)**

a unit of equivalent dose. Rem relates the absorbed dose in human tissue to the effective biological damage of the radiation. Not all radiation has the same biological effect, even for the same amount of absorbed dose.

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