

## WHAT IS PLUTONIUM?

Plutonium is a heavy metal, like lead or uranium. Most of the plutonium used in weapons is Pu-239 that has a radioactive half-life of about 24,000 years. Plutonium released in a weapons accident is in the chemical form of plutonium oxide.

## EXPOSURE TO PLUTONIUM

A person breathing in or swallowing some of the plutonium oxide released during a weapons accident would have an exposure to plutonium. The plutonium oxide may be carried in the smoke plume or cloud that results from a fire after the explosion or just the explosion may spread it.

Plutonium particles from the plume or explosion will settle on the ground, roofs, vehicles, etc. but they can get back up into the air or become “resuspended” by the wind, vehicles driving through or by people walking the contaminated area. This can also lead to a person breathing in or swallowing plutonium particles.

How much gets back into the air depends on how much has settled out of the plume and the nature of the ground or surface where the material is, (dry, wet, flat, rocky, grassy etc.) Another possible way people may get contaminated is by eating crops that were contaminated or by touching a contaminated area with their hands and then touching their nose or mouth. This type of exposure is expected to be less serious than inhalation.



# Plutonium

## WHY IS PLUTONIUM HAZARDOUS?

Plutonium is an internal body hazard. Even high levels of plutonium contamination on the ground will not produce any significant external radiation hazards. If the plutonium gets inside the body it can deposit alpha particles into living cells delivering a “dose” of radiation to the individual. The radiation can damage or kill the cells.

Radiation exposure from a weapons accident is unlikely to cause immediate health affects. The concern from such an exposure is that people may breath in or swallow enough plutonium to increase their risk of getting cancer.

About 40% of the plutonium taken in with a breath of air is exhaled immediately. Within the first week, a large fraction of the plutonium that was breathed in will be cleared out of the lungs and removed from the body through the digestive tract. This is because the lungs have a “self-cleaning” system that moves inhaled plutonium up out of the lungs into the throat, where it is swallowed then eliminated through the digestive tract. Over the next several months and years plutonium may either be cleared from the lungs into the digestive tract and then eliminated or absorbed into the blood stream. Plutonium absorbed into the bloodstream will be deposited

primarily in the bones and liver where it remains for many years.

## WHAT IF I AM EXPOSED TO PLUTONIUM?

If you think you traveled through the contaminated area or you were down wind of where the plume of smoke carrying the contamination traveled you may have been exposed. You should contact the appropriated state or federal agency in the area and let them know. They will arrange for the appropriated assessment to determine if you have been contaminated and treatment to be done if needed.

Testing to locate, identify, and quantify radionuclide contamination may include swabs from body orifices to assess possibility of internal contamination, getting samples of feces and/or urine. Analysis of stool samples provides the most accurate determination of how much plutonium was taken into the body. Urine samples although less sensitive than stool samples provide useful information.

Another process that might be used is called a “lung count.” A very sensitive radiation detector is placed near a person’s chest to “look” for low energy x-rays emitted by the plutonium. The lung count is not an x-ray exam – the individual undergoing the exam receives no radiation dose. A quick screening exam may take 10-15 minutes. A more sensitive exam performed at a special “whole body counting” facility typically takes about 45-50 minutes.

For Further Information Contact:

NNSA Service Center, Office of Public Affairs  
P.O. Box 5400 • Albuquerque, New Mexico 87185

505-845-6202; Fax 505-845-6206; Internet: [www.doeal.gov/opa](http://www.doeal.gov/opa)

## OTHER AREAS THAT MAY BE EXPOSED

As stated earlier the body will begin eliminating the plutonium through normal pathways for excreting wastes. However, if a person has a high intake of plutonium, doctors may consider using a drug called "DTPA" which can speed up the elimination of the plutonium from the body. DTPA is known as a chelating agent.

Contaminated body openings, such as the mouth, nose, eyes, and ears need special attention because getting radioactive material inside you body from these openings is likely to be much easier than through the skin.

If radioactive material has entered the mouth, brushing the teeth with toothpaste and frequent rinsing of the mouth will help in removing the contamination. If you think you may have contamination in your throat, gargling with a 3-percent hydrogen peroxide solution might be helpful. Drinking water will aid in removal of radioactive materials that may have been swallowed. Contaminated eyes should be rinsed by directing a stream of water from the inner to the outer corner of the eye while avoiding getting the contamination in your nose. Contaminated ears require external rinsing, an ear syringe can be used to aid in rinsing out contamination.

Decontamination of the skin is a relatively simple procedure. Complete decontamination, which returns the area to a background

survey reading, is not always possible because some radioactive material can remain fixed on the skin surface. Decontamination should be only as thorough as practical.

Take care not to cause irritation by rubbing too hard or using harsh soap products when washing the skin. The simplest procedure is to wash the contaminated area gently under a stream of water (do not splash) and scrub at the same time using a soft brush or surgical sponge. Warm, never hot, tap water is used. Cold water tends to close the pores, trapping radioactive material. Hot water causes the pores to open, and enhances the chance of absorption of the radioactive material through the skin.

Washing with plain water may not remove the contamination so you may have to rewash the area with a mild soap (neutral pH) or surgical scrub soap. The area should be scrubbed for 3 to 4 minutes, then rinsed for 2 to 3 minutes and dried, repeating if necessary. Contaminated hairy areas can be shampooed several times.

Between each scrub and rinse, check the contaminated area to see if radiation levels are decreasing. **The decontamination procedure stops when the radioactivity level cannot be reduced to a lower level.** Expert advice might be needed to determine an appropriate stopping point.

If your house was downwind of the smoke plume it is possible that it may be contaminated. If you believe your house has been contaminated contact the state or federal authorities. They will arrange for a team of survey experts to go to your

home and check for possible contamination.

Lakes and rivers may get contamination in them from the plutonium plume that settled. The plutonium is heavy and should settle to the bottom and eventually is trapped in the sediment. Bottom feeding fish may eat some of the contaminated sediment but very little plutonium is absorbed into an animal's body through its digestive tract. So very little plutonium would be in the meat of the fish that you might eat. But it is still a good idea to check with state and federal experts regarding eating fish from waters that have been contaminated with plutonium.

Fruits and vegetables grown in the area of contamination may also have plutonium on them from the plume. Although most of this plutonium could be washed off easily it is better if you discard the contaminated fruits or vegetables you know was exposed. Uptake to plants from the soil is generally very low so the levels of plutonium in produce grown after the initial plume passage should be insignificant.

It is unlikely that ground water would become contaminated. Plutonium does not easily seep through soil. However groundwater in the area of contamination will be tested approved before use.