What is radioactive material and what is radiation?

Radioactive materials are composed of atoms that are unstable. These unstable atoms are called radionuclides. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation. This energy may be emitted as particles (called alpha, beta, and neutron radiation) or waves (called x-ray, gamma ray, or electromagnetic radiation). Each of us is exposed to radiation daily from natural sources; it is present in our air, water, soil and food. Radiation also is released from man-made sources such as x-ray machines, cancer treatment procedures, and there are even small amounts of radioactive materials in smoke detectors that enable them to work.

Are any radiation levels safe?

During emergencies, the U.S. Environmental Protection Agency's Protective Action Guides recommend actions such as sheltering in place and evacuation when projected doses are in the range of 10-50 millisieverts (1000-5000 millirems).

What are the potential radiation exposures from accidents at nuclear power plants?

The potential radiation exposure from an accident at a nuclear power plant depends on the severity of the incident. The most likely exposure could come from a release of radioactive material from the plant into the environment when the plant is not working properly. The main radiological concerns are breathing in or swallowing radioactive cesium and radioactive iodine.

What are the current risks of radiation exposures from the nuclear power plant emergencies in Japan?

Currently, the main radiological concerns are inhaling or ingesting radioactive cesium and radioactive iodine. Radiation-related health risks depend on exposure; the exposure depends on the amount of material released, the weather patterns, the distance from the plant, and how long someone is exposed.

Is radiation different from radioactive contamination?

Yes, radioactive contamination is radioactive material in places where it's not wanted; radiation is simply the energy (particle and waves) emitted by the radioactive material.

What about my food?

Keep food in covered containers or in the refrigerator. Food not previously covered should be washed before being put into containers.

Should I take potassium iodide?

Potassium iodide can lower the amount of radioactive iodine that enters your thyroid and lower the risk of serious injury to your thyroid. Local public health or emergency management officials will tell the public if potassium iodide or other protective actions are needed. Pregnant women should take potassium iodide when instructed by authorities.

What should I do after the emergency?

Listen to officials for guidance on safe food and water sources and follow food preparation instructions to reduce risk of ingesting food or water contaminated with radioactive material. Seek medical treatment for any unusual symptoms, such as nausea or vomiting, skin redness, blistering or ulceration, bleeding gums or nosebleeds, or hair loss.

Where can I get additional information about radiation exposure?

- World Health Organization, FAQs - Japan nuclear concerns: http://www.who.int/hac/crises/jpn/faqs/en/index.html
- U.S. Nuclear Regulatory Commission (NRC): www.nrc.gov/
- U.S. Environmental Protection Agency (EPA): http://www.epa.gov/rpdweb00/index.html

References

- FEMA - Are You Ready? Nuclear Power Plants: http://www.fema.gov/areyouready/nuclear_power_plants.shtm
- REACT/S - Medical Aspects of Radiation Incidents: http://orise.orau.gov/files/reacts/medical-aspects-of-radiation-incidents.pdf

USAPHC
U.S. ARMY PUBLIC HEALTH COMMAND (Provisional)

http://phc.amedd.army.mil

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Radiation Exposure from Nuclear Power Plant Incidents

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What is the difference between low and high-level radiation exposures?

"Low" and "high" generally refer to the relative dose of radiation. Low-level exposures, such as being near sources of radiation outside the body (such as medical x-ray machines) or inhaling or eating small amounts of radioactive material, generally pose very small risks. Also, small but detectable amounts of radioactive contamination on the skin or clothing pose little or no health risk. A high-level exposure, by contrast, usually happens over a short time and might cause serious illness or death.

How do I minimize exposure to radiation?

Follow the guidance issued by your local authorities. During a nuclear power plant emergency, officials will continuously measure the radiation levels and radioactive contamination and identify steps to protect the public. Local garrisons have emergency plans in place that include radiological emergencies. Emergency officials use the principles of time, distance, shielding, sheltering in place, and evacuation to reduce radiation exposure.

Time - The less time you are exposed the smaller the risk.

Distance – The more distance between you and the source of the radiation, the better.

Shielding – In general, denser and thicker materials between you and the source reduce the level of radiation reaching you.

Shelter in place – Remaining indoors with the ventilation (air conditioning or heating systems) turned off to minimize exposure.

Evacuation – In more serious situations, evacuation might be recommended.

Will I need to Shelter in Place or Evacuate?

Officials may direct people to shelter in place or evacuate based upon exposure levels. The following are guidelines for what you should do during a nuclear power plant emergency:

If you are told to evacuate:

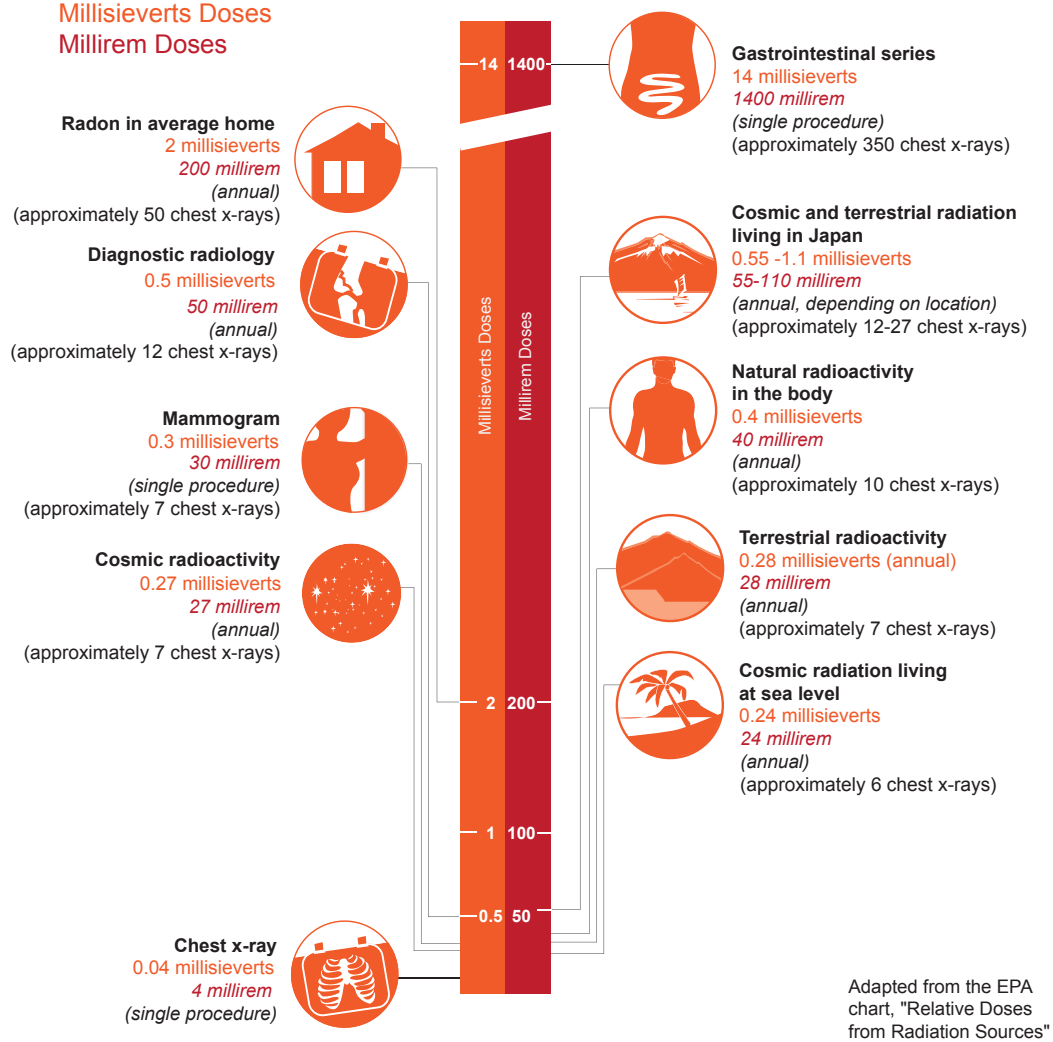
- Keep car windows and vents closed; use re-circulating air.
- Listen to the radio for emergency updates.
- Follow the instructions of traffic authorities.

If you are advised to shelter in place (remain indoors):

- Turn off the air conditioner, ventilation fans, furnace, and other air intakes.
- Go to a basement or other underground area, if possible.
- Keep your radio or television tuned to the emergency response network or local officials.
- Do not use the telephone unless absolutely necessary.

If you are concerned that you might have been contaminated with radioactive materials:

- Change clothes and shoes.
- Put contaminated clothing in a plastic bag.
- Seal the bag and place it out of the way.
- Take a thorough shower.
- Listen to instructions from emergency officials. Officials may direct you to shelters for decontamination and further monitoring to ensure radioactive materials have been removed.



Adapted from the EPA chart, "Relative Doses from Radiation Sources"