



# New York State Radiological Emergency Preparedness Program

## Radiological Information

### Emergency Classification Levels

There are four levels of radiological emergencies at a commercial nuclear power plant, as defined by the Nuclear Regulatory Commission (NRC):

- **Unusual Event**
- **Alert**
- **Site Area Emergency**
- **General Emergency**

The response taken by Westchester, Rockland, Orange and Putnam counties and New York State will depend on the severity of the incident described by these classifications.

Because these four classifications are based on specific plant conditions and measurements, they provide a clear indication of the seriousness of the event.

**Unusual Event:** Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected, unless further degradation of safety systems occur.

**Alert:** Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the [Environmental Protection Agency \(EPA\) Protective Action Guideline](#) exposure level.

**Site Area Emergency:** Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

**General Emergency:** Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposures offsite for more than the immediate site area.

### Glossary: Emergency Planning

**Congregate Care Center:** Facility where shelter and food is provided to evacuees.

**Disaster Preparedness Plan:** A plan that details comprehensive emergency procedures for all types of disaster emergencies in the state, i.e., floods, hurricanes, etc. A portion of the Disaster Preparedness Plan is the Radiological Emergency Preparedness Plan.

**Emergency Operations Center (EOC):** A designated location at county and/or state headquarters from which a chief executive and staff can direct the action of state and local agencies and emergency services.

**Emergency Operations Facility (EOF):** A facility operated by the power plant licensee for evaluating and controlling emergency situations and coordinating responses with local and state representatives; its location normally is outside the plant exclusion area.

**Emergency Planning Zone (EPZ):** The area surrounding a nuclear power plant site designated for emergency planning purposes.

- **Plume Emergency Planning Zone** encompasses a radius of about 10 miles for the plume exposure pathway.

- **Ingestion Emergency Planning Zone:** The area surrounding a site within approximately a 50-mile radius where the principal source of exposure from an accident would be the ingestion of contaminated food or water.

**Protective Action Areas:** A subdivision of the plume exposure emergency planning zone. An Emergency Planning Zone is made up of several Protective Action Areas.

**Evacuation | Potassium Iodide (KI) Administration:** Everyone within specific Protective Action Areas are instructed to leave the area and, if they have Potassium Iodide (KI), to ingest one dose – a 130 mg. tablet. Children under one year of age should be given a 65-mg dose or one-half of the adult tablet.

**Exclusion Area:** The area surrounding a nuclear power plant facility in which the facility operator has the authority to determine and control all activities. No residences exist within a nuclear power plant exclusion area.

**Nuclear Facility Operator (NFO):** The organization licensed by the Nuclear Regulatory Commission to operate a nuclear facility.

**Plume:** A “cloud” of radioactive material made up of gases or particulates.

**Prevention/Mitigation:** The first of three designated phases of activity in the state and county plans for radiological emergencies; response and recovery phases follow. Actions during this phase aim to eliminate or reduce the probability of an emergency occurring, and minimize the impact of an emergency on public health and property.

**Response:** The phase of activity in a radiological emergency when protective actions are taken to protect public health and mitigate effects of a radioactive release.

**Recovery:** The last phase of activity in the state and county plans for radiological emergencies; efforts during this phase are to return to pre-emergency conditions.

**Protective Action:** Any action taken to protect the public’s health in response to a radiological emergency, i.e., recommending sheltering or evacuation/ingesting KI.

**Reception Center:** A pre-designated location outside the plume exposure pathway Emergency Planning Zone through which evacuees will pass to receive initial assistance, including personal monitoring, receive additional potassium iodide (KI), first aid or direction to a congregate care center or medical facility.

**Shelter-In-Place:** This public protective action directing people to stay inside and limit access to outside air would be made by local elected and health officials. The decision would be based primarily on plant and meteorological conditions and announced over the Emergency Alert System.

## **Glossary: Radiological Definitions**

**Airborne Radioactive Material:** Any radioactive material dispersed in the air in the form of dust, fumes, mist, vapor or gas.

**Background Radiation:** Cosmic rays and natural radiation are always present in the environment. In addition, man-made sources also contribute to the background radiation level. The average New Yorker receives approximately 360 millirem per year from background radiation.

**Curie (Ci):** Amount of radioactive material in which 37 billion atoms decay per second. The rate at which radioactive material is released to the environment may be expressed in units of curies per second (Ci/sec).

**Decontamination:** The reduction or removal of contaminating radioactive material from a structure, area, object or person.

**Dose:** The amount of energy absorbed by matter received from ionizing radiation per unit mass of matter. Dose is expressed in rads.

**Dosimeter:** A personal monitoring instrument that measures the radiation dose received by an individual using the device.

**Exposure:** A measure of the ionization produced in air by X- or gamma radiation, and expressed in roentgens (R). Although “dose” and “exposure” are often used interchangeably, “dose” is a measurement of energy absorbed in body tissue, and “exposure” is a measurement of ionization in the air due to the presence of radiation.

- **Rad:** Unit of radiation dose.
- **Roentgen (R):** Unit of exposure, applicable only to X- and gamma radiations.
- **Rem:** A unit used to express all types of ionizing radiation on a common scale to indicate relative biological effects. For beta and gamma radiation: exposure to 1 roentgen delivers a dose of 1 rad, which is equivalent to 1 rem.

**Half-life:** The time required for radioactive material to lose 50% of its activity by radioactive decay.

**Isotope:** A radioactive form of a chemical element with varying numbers of neutrons in the nucleus.

**Potassium Iodide (KI):** A substance taken as a protective measure to reduce the uptake by the thyroid of radioiodine, i.e., potassium iodide (KI). KI is not an alternative to evacuation. It protects one organ - the thyroid - from one form of radiation – radioiodine. A 130-mg tablet is the recommended dose. Children under one year of age should be given a 65-mg dose or one-half of the tablet. KI is available from counties’ emergency management offices or as an over-the-counter medicine at many drug stores.

**Monitoring:** Periodic or continuous measuring of radiation by means of survey instruments that can detect and measure ionizing radiation.

- **Area Monitoring:** Measurement of radiation level or contamination present in a specific area, building, room, etc.
- **Personal Monitoring:** Measurement of radiation levels that may have been received by an individual to the whole body or specific organs or body parts. The most common devices used for measuring exposure from external sources are film badges, thermoluminescent dosimeters (TLDs) and pocket dosimeters. Whole body counting or measurements of breath or excretions may be taken to determine intake of radioactive materials.

**Radiation:** The emission of energy through a material medium in the form of electromagnetic waves or particles that may impart their energy to the medium through the creation of electrically charged ion pairs. X- and gamma rays, and alpha and beta particles are examples of ionizing radiation.

- **Gamma Radiation:** Pure energy emitted from the nucleus of an unstable isotope.
- **Beta Radiation:** An electron emitted from the nucleus of an unstable isotope.

**Radioactive Decay:** The process by which an unstable nucleus of an atom spontaneously releases energy through the emission of radiation.

**Radioactive Release:** Introduction of radioactive materials into an uncontrolled environment.

**Thyroid Exposure:** Exposure of the thyroid gland to radiation from radioactive isotopes of iodine, which have either been inhaled, absorbed or ingested. Accumulation of iodine is rapid in the thyroid gland

**Thermoluminescent Dosimeter (TLD):** A dosimeter made of material that when heated emits light in amounts proportional to the amount of radiation dose it received. Placed in a badge-type holder, it can be worn by an individual to measure possible exposure to ionizing radiation.

**Whole Body Exposure:** Exposure of a major portion of the body to an external radiation field or radioactive material distributed throughout the body. Exposure of blood-forming organs, reproductive organs, head, trunk and lenses of the eyes is also considered exposure of the whole body.