Radiation Protection

Protective Action Guides

Protective Action Guides (PAGs) help state and local authorities make radiation protection decisions during emergencies. EPA developed the PAG Manual to provide guidance on actions to protect the public.

Get e-mail updates when this information changes.

On this page:

When and how would PAGs be used?

The PAGs suggest precautions that state and local authorities can take during an emergency to keep people from receiving an amount of radiation that might be dangerous to their health. The PAGs provide guidance only.

Responders can use the PAG Manual in any radiation emergency:

- nuclear power plant incident
- foreign reactor incident
- research facility incident
- contaminated materials at steel mills or scrap metal recycling facilities
- transportation accidents involving radioactive materials
- radiological dispersal devices (RDDs) or dirty bombs
- improvised nuclear devices (INDs)

The following table shows various protective actions and how emergency personnel apply them during each phase of a nuclear emergency.

Related Links

Exposure Pathways and Protective Actions

These are examples of exposure routes and various protective actions. The phases are not set timeframes and protective actions may overlap more than one phase.

POTENTIAL EXPOSURE PATHWAYS	INCIDENT PHASES	PROTECTIVE ACTIONS
1. External radiation from facility	EARLY	1. Sheltering, evacuation, control of access
2. External radiation from plume	EARLY	2. Sheltering, evacuation, control of access
3. Inhalation of activity in plume	EARLY	3. Sheltering, administration of stable iodine, evacuation, control of access
4. Contamination of skin and clothes	EARLY / INTERMEDIATE	4. Sheltering, evacuation, decontamination of persons
5. External radiation from ground deposition of activity	EARLY / LATE	5. Evacuation, relocation, decontamination of land and property
6. Ingestion of contaminated food, water	INTERMEDIATE / LATE	6. Food and water controls
7. Inhalation of re-suspended activity	INTERMEDIATE / LATE	7. Relocation, decontamination of land and property

Notes:

Stored animal feed and uncontaminated water could be used to protect domestic animals in the food chain from consuming radioactivity. This can be done in any of the phases.
Evacuation occurs in the early, or emergency, phase of a nuclear incident and relocation occurs during the intermediate phase and may continue into the late, or recovery, phase.

Is training in use of the PAGs available?

Yes. FEMA's Emergency Management Institute has two Independent Study Courses on Radiation:

IS-3
Radiological Emergency Management

IS-301
Radiological Emergency Response, of which Unit 5, "Protective Actions & Protective Action Guides" provides an excellent introduction to the use of PAGs in an emergency.

What guidance is currently in use?

In addition to EPA's 1992 PAGs Manual, the following radiological emergency response guidance is available:

Dept. of Energy's Federal Radiological Monitoring and Assessment (FRMAC): FRMAC Assessment Manual, Volume 1 - Overview and Methods [about pdf format]
Dept. of Energy's Federal Radiological Monitoring and Assessment (FRMAC): FRMAC Assessment Manual, Volume 2 – Pre – assessed Default Scenarios [about pdf format]
The Homeland Security Council: Planning Guidance for Response to a Nuclear Detonation (2010) (135 pp, 2.47MB) [about pdf format]
Food and Drug Administration:
Guidance: Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies (PDF)
Guidance for Industry KI in Radiation Emergencies -Questions and Answers (2002)
Frequently Asked Questions about KI
Centers for Disease Control and Prevention: Population Monitoring in Radiation Emergencies: A Guide for State and Local Public Health Planners (2007) [about pdf format]
Food and Drug Administration: Accidental Radioactive Contamination of Human Food And Animal Feeds: Recommendations for State and Local agencies (1998)
Department of Energy:
- Operational Guidelines
- Preliminary Report on Operational Guidelines Developed for Use in Emergency Preparedness and Response to a Radiological Dispersal Device Incident (2009) [about pdf format]

The Department of Homeland Security/ Federal Emergency Management Agency: Planning Guidance for Protection and Recovery Following Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents (2008)

How can I obtain a copy of the 1992 PAGs?

While we no longer have hard copies of the PAGs for distribution, an electronic version in PDF format is available:

Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (PDF) [about pdf format] [EPA 400-R-92-001] for downloading or viewing.
Implementation of Protective Actions for Radiological Incidents at Other Than Nuclear Power Reactors (PDF)

(Please note: This document is not currently accessible for those using screen readers. If you need assistance accessing its contents, please Contact Us.)

What is the status of the PAG Manual update?

The PAG Manual is an important science-based guideline that addresses emergency action levels for radiation exposure. Draft revisions were approved by the former Deputy Administrator shortly before the inauguration. The new team at EPA wishes to review the PAGs revisions before proceeding with a notice of availability and public comment.

Understanding Radiation in Your Life, Your World

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