



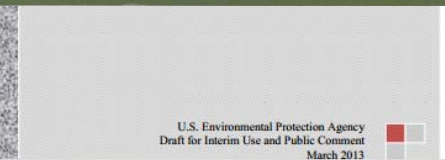
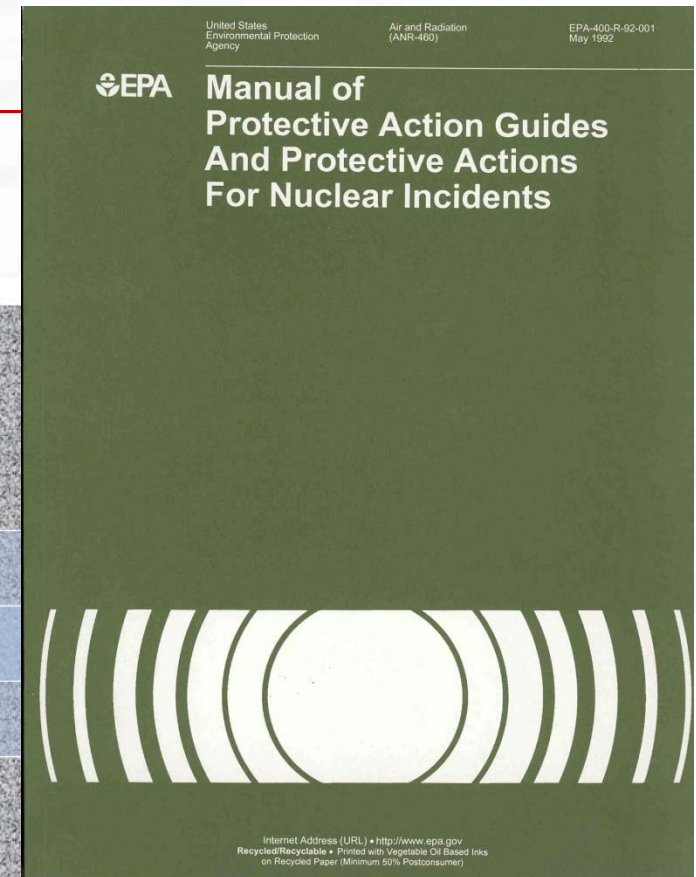
2013 PAG Manual Revision

Overview with Questions & Answers

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PAGs Manual

- Protective Action Guides (PAGs) Manual (1992)
- Early, Intermediate Phases only
- Promised Water and Late Phase (Recovery) PAGs



2013 Draft PAG Manual

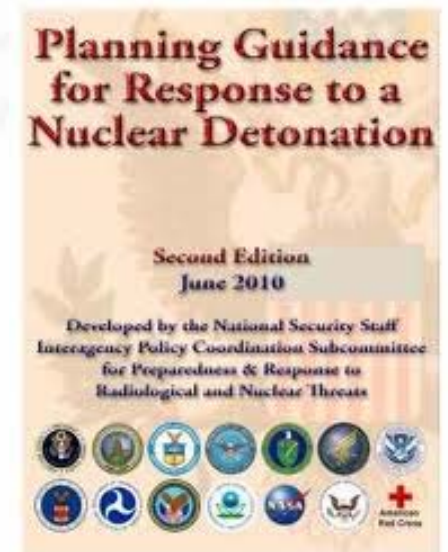
- Clarifies the use of PAGs for all radiological incidents, including terrorism
- Lowers projected thyroid dose for KI, via FDA
- Requests input on drinking water guidance
- Refers to 1998 FDA food guidance
- Includes guidance for long-term site restoration
- Updates dosimetry from ICRP 26 to ICRP 60, by referring to FRMAC methods

When Do PAGs Apply?

- Not for radioactively contaminated sites
- Releases, incidents, or accidents
- Public protection is the focus
- Guidance, not regulatory
- This is not CERCLA or Superfund
- Avoided dose \neq safe limit to allow

Relationship of EPA and DHS PAGs

- DHS vetted the Early and Intermediate PAGs for RDDs or INDs and provided needed guidance for Late Phase (recovery) guidance in 2008
 - ✓ EPA PAG Manual incorporates this late phase guidance
 - ✓ DHS document will 'sunset' when PAG Manual is finalized
- Planning Guidance for IND (2010)
 - ✓ PAGs don't apply well after an IND
 - ✓ Scope and scale
 - ✓ Priority on lifesaving and avoiding acute effects
 - ✓ Short response timeframe
 - ✓ Unique fallout decay curve
 - ✓ Referenced in PAG Manual



Federal Register Questions

- Regarding the entire Manual:
 - ✓ Readers are referred to FRMAC Assessment Manuals for calculations using up-to-date dosimetry. Please comment on the usefulness of this approach and how to facilitate implementation of these methods.

Early Phase

1992

- Evacuation/Shelter 1-5 rem (10-50 mSv)
 - ✓ thyroid/skin 5, 50 x higher
- KI 25 rem (250 mSv) thyroid dose (adult)
- Worker 5, 10, 25+ rem (50, 100, 250+ mSv)

2013

- Evacuation/Shelter 1-5 rem (10-50 mSv)
 - ✓ (no organ dose specified)
- KI threshold 5 rem (50 mSv) thyroid dose (child)
- Worker 5, 10, 25+ rem (50, 100, 250+ mSv)

Potassium Iodide (KI) Actions

- FDA recommends a multi-pronged approach:

| Threshold Thyroid Radioactive Exposures and Recommended Doses of KI for Different Risk Groups | | | | |
|--|---------------------------------|--------------|---------------------|--------------------|
| | Predicted Thyroid exposure(cGy) | KI dose (mg) | # of 130 mg tablets | # of 65 mg tablets |
| Adults over 40 yrs | ≥500 | 130 | 1 | 2 |
| Adults over 18 through 40 yrs | ≥10 | | | |
| Pregnant or lactating women | | | | |
| Adoles. over 12 through 18 yrs* | ≥ 5 | 65 | 1/2 | 1 |
| Children over 3 through 12 yrs | | 32 | 1/4 | 1/2 |
| Over 1 month through 3 years | | 16 | 1/8 | 1/4 |
| Birth through 1 month | | | | |

- A simplified approach:
 - ✓ Provide KI to public if 5 rem (50 mSv) child thyroid dose projected
 - ✓ This is a supplemental action where evacuation is the primary protection

Guidance for Emergency Workers

| Dose (rem) | Activity | Condition |
|------------|---|----------------------------|
| 5 | All | None |
| 10 | Protecting valuable property | Lower dose not practicable |
| 25* | Lifesaving or protection of large populations | Lower dose not practicable |

* Greater than 25 rem for lifesaving only to volunteers aware of the risks

Federal Register Questions

Regarding the Early Phase:

- Please comment on the usefulness of the simplified KI implementation guidance
- Please comment specifically on the appropriateness of not retaining the skin and thyroid evacuation thresholds

Intermediate Phase

1992

- Relocate population
 - ✓ ≥ 2 rem (20 mSv) first year (projected dose)
 - ✓ 0.5 rem (5 mSv) any subsequent year
 - ✓ 5 rem (50 mSv) over 50 yrs
- Apply dose reduction techniques
 - ✓ < 2 rem (20 mSv)

2013

- Relocate population
 - ✓ ≥ 2 rem (20 mSv) first year (projected dose)
 - ✓ 0.5 rem (5 mSv) any subsequent year
 - ✓ (removed 50-year Relocation PAG)
- Apply dose reduction techniques
 - ✓ < 2 rem (20 mSv)

Re-entry Matrix

- New quick reference matrix
- Public, workers re-entering Relocation area to work during cleanup
- Basis: Relocation PAGs
- Assumptions: Detailed exposure scenarios in Operational Guidelines
- Do it yourself: RESRAD-RDD software

The screenshot shows a PDF document titled "PAG Manual for Interim Use and Comment 4-2-2013.pdf" in Adobe Reader. The document is dated March 2013 and is a draft for interim use and public comment. It contains a table with three rows of re-entry matrices and a graph showing limiting concentrations of Cs-137 for access to barriers.

| Intermediate Phase (first 30 days and up to a year) | Reentry For Use of Critical Infrastructure | Reentry For Use of Roads and Walkways | Reentry For Access to the Relocation Zone |
|---|--|---|--|
| | Radiation Worker Protection Radiation Worker Protection: (dose not to exceed) 5,000 mrem (50 mSv) per year (<i>Radiation Protection Guidance to Federal Agencies for Occupational Exposure, EPA 1987</i>). Radiation workers have knowledge of the risks associated with radiation exposure, training to protect themselves and document to track their doses. During an incident response, workers (police, waste handlers) needed in contaminated areas could be trained and given dosimeters. The guidance for Radiation Workers applies throughout the response. | Public: 2,000 mrem (20 mSv) first year; 500 mrem (5 mSv) per year in subsequent years (<i>Operational Guidelines, Group D</i>). While the dose values here are similar to those for Use of Critical Infrastructure above, the derived concentrations measured as triggers are different because the exposure conditions are different. | Public: 500 mrem (5 mSv) over one year for temporary access with stay times dependent on reentry tasks and site-specific conditions (<i>Operational Guidelines, Group D</i>). "Stay time" is a term of art used in the radiation safety field. Stay times are the amount of time a person may access the contaminated area. These times vary based upon site-specific factors or incident characteristics such as indoor or outdoor work, sensitive populations and level of radioactivity. Section 7.1 of the Operational Guidelines, "Worker Access to Businesses for Essential Actions," provides tables and graphs of stay times at various limiting concentrations (see Figure 7.5 and Table 7.8). For example, if the maximum surface concentration is very effective, but requires specialized equipment and trained operators. Surface sealing is easier, but leaves the contamination in place, making it viable only in locations where the dose rates are low enough for occupation, or in low-occupancy areas. Repairing roads, lots and other paved surfaces is easy to implement, but can generate significant waste volumes. Unpaved areas can be further remediates by soil skimming (surface removal), deep plowing (turning the top foot or so of soil over) and appropriate chemical soil amendment methods like liming or chelating. As the intermediate plans progress, knowledge and experience increases and these methods can be re-applied, refined or customized for problem areas. Decisions about more difficult areas will benefit from professional judgment, additional analyses and application of more sophisticated technologies. |

FIGURE 7.8 Limiting Concentrations of Cs-137 for Access to Barriers

Federal Register Questions

Regarding the Intermediate Phase:

- Please comment on the appropriateness of removing the 5 rem over 50 years Relocation PAG
- Please comment on the format and utility of new Re-entry guidance
- Comment on whether it would be useful to develop a combined, all-pathways Intermediate Phase PAG

Drinking Water PAG

1992

- Promised

2013

- National Primary Drinking Water Regulations provide emergency actions
 - ✓ Increased monitoring
 - ✓ Notifications
- Comments sought on whether, and what value, an emergency PAG for water should be considered

Drinking Water PAG

- Comments sought on whether, and what value, an emergency PAG for water should be considered
- Other related guides from WHO, IAEA, DHS, FDA may inform your input



FDA Food PAGs

1992

- 1982 FDA guidance
- NCRP 39 methodology
- Preventive PAG 0.5 rem (5 mSv) whole body and 1.5 rem (15 mSv) thyroid
- Emergency PAG 10 times higher, depends on impact
- Dose only, no activity levels provided

2013

- 1998 FDA guide, by reference
- ICRP 56 & NRPB methods
- One set of PAGs
 - ✓ 0.5 rem (5 mSv) whole body dose or
 - ✓ 5 rem (50 mSv) to most exposed organ or tissue
- Dose and derived intervention levels (DILs) provided

Federal Register Questions

Regarding Food and Water:

- Input on the appropriateness of, and possible values for, a drinking water PAG is being sought
- Since FDA's 1998 Food guidance is already final and published, comments are not requested on it

Late Phase: Cleanup Goal

- Customer expectation of cleanup goal = background?
- Prescriptive or flexible
- Time, costs, risks, benefits
- What about your personal items?

Step-wise Process

- Characterization and stabilization
- Establish cleanup goals based on options analysis
- Implementation and reoccupancy

Decision-Making Organizations

- Focus on process for reaching consensus:
 - ✓ Decision Team – might be requesting funding
 - Senior local, state and federal officials
 - ✓ Recovery Management Team
 - Senior leadership in the field recovery effort
 - ✓ Stakeholder Working Group
 - Community leaders, local businesses, nongovernmental representatives, members of the public
 - ✓ Technical Working Group
 - Select subject matter experts, communicators

Late Phase: Waste Management

- Document focuses on options for disposal
 - ✓ Licensed LLRW disposal facilities
 - ✓ RCRA solid and hazardous waste landfills
 - ✓ Federal facilities/sites
 - ✓ Newly developed disposal capacity
 - ✓ Appropriate for level of hazard
- States bear primary responsibility
 - ✓ Waste volumes will drive decision-making
 - Could overwhelm existing disposal capacity (see Japan)
 - Need to be considered in early planning

EPA Waste Management Resources

- Waste Estimation Support Tool (WEST)
 - ✓ First-order estimates of waste types and volumes
 - ✓ Based on analysis of plume maps
- CBR Disposal Technology Workshop report
 - ✓ Technical issues in developing new capacity
 - ✓ <http://www.epa.gov/nhsrc/pubs.html>
- Minimization/Segregation Technology Guideline
 - ✓ Developed through the WARRP effort (available soon)
- Interactive, web-based waste management planning tool for incidents (early concept)

Federal Register Questions

Regarding Late Phase:

- Please comment on the usefulness of the brief cleanup planning guidance, and how it might be implemented in state, tribal and local plans
- Please comment on the merging of the 2008 DHS RDD/IND cleanup guide with this Manual
- Please comment on the basic waste disposal planning guidance and how it should be implemented in plans at all levels of government

The End

Comments or questions?