



ENVIRONMENTAL PROTECTION AGENCY

6560-50-P

[EPA-HQ-OAR-2007-0268; FRL-9956-19-OAR]

Final revision to the PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of document availability.

SUMMARY: As part of its mission to protect human health and the environment, the U.S. Environmental Protection Agency (EPA) publishes protective action guides to help federal, state, local and tribal emergency response officials make radiation protection decisions during emergencies. The EPA, in coordination with a multi-agency working group within the Federal Radiological Preparedness Coordinating Committee (FRPCC), has made final updates to the 1992 Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, referred to as "The 1992 PAG Manual" (EPA 400-R-92-001, May 1992).

The updated guidance in the revised PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents ("PAG Manual" hereafter) applies the protective action guides (PAGs) to incidents other than nuclear power plant accidents, updates the radiation dosimetry and dose calculations based on current science and incorporates late phase guidance. The final revisions incorporate input from public comments received in 2013 and include clarifications based on those comments. The Agency plans to finalize drinking water guidance after incorporating public comments on a proposal published in June 2016. The intention is to add it as a section in the Intermediate Phase chapter of the PAG Manual and reissue the PAG Manual once complete. The final revision of the PAG Manual is available at www.regulations.gov.

DATES: The PAG Manual is available for use upon publication of this Notice in the *Federal Register*.

FOR FURTHER INFORMATION CONTACT: Sara DeCair, Radiation Protection Division, Center for Radiological Emergency Management, Mail Code 6608T, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue NW, Washington, DC 20460; telephone number: (202) 343-9108; fax number: (202) 343-2304; E-mail: *decair.sara@epa.gov*.

SUPPLEMENTARY INFORMATION:

A. How can I get copies of the PAG Manual and supporting information?

Docket: All documents in the docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. The EPA has established a docket for this action under Docket ID No. [EPA-HQ-OAR-2008-0268; FRL-9707-2]. Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at the Air and Radiation Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC 20004. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744 and the telephone number for the Air and Radiation Docket is (202) 566-1742. In accordance with EPA regulations at 40 CFR Part 2 and in accordance with normal EPA docket procedures, if copies of any docket materials are requested, a reasonable fee may be charged for photocopying.

Electronic access: The PAG Manual in electronic form suitable for printing, as well as related guidelines and further information, can be found on the PAGs web page at <http://www.epa.gov/radiation/protective-action-guides-pags>.

B. What authority does the EPA have to provide Protective Action Guidance?

The historical and legal basis of the EPA's role in the PAG Manual begins with Reorganization Plan No. 3 of 1970, in which the Administrator of the EPA assumed functions of the Federal Radiation Council (FRC), including the charge to "...advise the President with respect to radiation matters, directly or indirectly affecting health, including guidance for all federal agencies in the formulation of radiation standards and in the establishment and execution of programs of cooperation with states." (Reorg. Plan No. 3 of 1970, sec. 2(a) (7), 6(a) (2); § 274.h of the Atomic Energy Act of 1954, as amended (AEA), codified at 42 U.S.C. § 2021(h)). Recognizing this role, the Federal Emergency Management Agency (FEMA) directed the EPA in their Radiological Emergency Planning and Preparedness Regulations to "establish Protective Action Guides (PAGs) for all aspects of radiological emergency planning in coordination with appropriate federal agencies." (44 CFR 351.22(a)). FEMA also tasked the EPA with preparing "guidance for state and local governments on implementing PAGs, including recommendations on protective actions which can be taken to mitigate the potential radiation dose to the population." (44 CFR 351.22(b)). All of this information was to "be presented in the Environmental Protection Agency (EPA) 'Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.'" (44 CFR 351.22(b)).

Additionally, section 2021(h) charged the Administrator with performing "such other functions as the President may assign to him [or her] by Executive order." Executive Order 12656 states that the Administrator shall "[d]evelop, for national security emergencies, guidance

on acceptable emergency levels of nuclear radiation....” (Executive Order No. 12656, sec.1601(2)). The EPA’s role in PAGs development was reaffirmed by the *National Response Framework, Nuclear/Radiological Incident Annex* of June 2008.

C. What is the PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents?

The PAG Manual provides federal, state and local emergency management officials with guidance for responding to radiological emergencies. A protective action guide (PAG) is the projected dose to an individual from a release of radioactive material at which a specific protective action to reduce or avoid that dose is recommended. Emergency management officials use PAGs for making decisions regarding actions to protect the public from exposure to radiation during an emergency. Such actions include, but are not limited to, evacuation, shelter-in-place, temporary relocation, and food restrictions.

Development of the PAGs was based on the following essential principles, which also apply to the selection of any protective action during an incident—

- Prevent acute effects,
- Balance protection with other important factors and ensure that actions result in more benefit than harm,
- Reduce risk of chronic effects.

The PAG Manual is not a legally binding regulation or standard and does not supersede any environmental laws. This guidance does not address or impact site cleanups occurring under other statutory authorities such as the EPA’s Superfund program, the Nuclear Regulatory Commission’s (NRC) decommissioning program, or other federal or state cleanup programs. As indicated by the use of non-mandatory language such as “may,” “should” and “can,” the PAG

Manual only provides recommendations and does not confer any legal rights or impose any legally binding requirements upon any member of the public, states or any federal agency. Rather, the PAG Manual recommends projected radiation doses at which specific actions may be warranted in order to reduce or avoid that dose. The PAG Manual is designed to provide flexibility to be more or less restrictive as deemed appropriate by decision makers based on the unique characteristics of the incident and the local situation.

D. How did EPA respond to public comments on the 2013 PAG Manual revision?

The proposed updates to the 1992 PAG Manual, published for public comment and interim use in 2013, were developed by a multi-agency Subcommittee of the Federal Radiological Preparedness Coordinating Committee (FRPCC) and published by the EPA with concurrence from the Department of Energy (DOE); the Department of Defense (DoD); the Department of Homeland Security (DHS), including the Federal Emergency Management Agency (FEMA); the Nuclear Regulatory Commission (NRC); the Department of Health and Human Services (HHS), including both the Centers for Disease Control (CDC) and the Food and Drug Administration (FDA); the U.S. Department of Agriculture (USDA); and the Department of Labor (DOL).

The Agency received about 5,000 comments from members of the public, state and local emergency response and health organizations, industry associations, and from national and international radiation protection organizations. In response to comments received, questions raised in comments and issues identified about implementing the updated PAG Manual, the EPA made a number of changes to the PAG Manual, as described below.

The EPA received comments and questions on the potassium iodide (KI) PAG from state radiation protection agencies and from industry organizations. In response, planning considerations were clarified regarding the lower FDA KI PAG in combination with deleting the

thyroid-based evacuation threshold. The EPA added a Table (Table 2.2) with more details on the KI PAG; and also worked with the FDA to include a simplified approach to implementing this PAG and provided reference for the reader to the FDA's published guide. More explanation was included regarding the thyroid-based (organ-based) evacuation thresholds being deleted. This was done for simplicity and because modern dose projection tools now do a much better job of accounting for all-pathway exposures.

The EPA received many comments from PAG technical users suggesting terminology improvements and requesting more information about how the Federal Radiological Monitoring and Assessment Center (FRMAC) – the federal government lead for these calculations during radiological emergencies – provides calculation methods and tables of derived levels. Additional language is provided on the tables of derived values for implementing the PAGs. Specifically, clarifying text on FRMAC methods and dose factor terminology was added. Definitions for incident phases and several concepts around dose projection were also clarified.

The Agency received comments from state emergency management and radiation protection agencies, as well as federal agencies, requesting the inclusion of language from the 1992 PAG Manual Appendices in the revised PAG Manual. This text, focusing on the rationale and basis for setting early and intermediate phase PAGs, has been added to the revised PAG Manual. The 2013 proposal included this information only by reference, but the revised PAG Manual will serve the emergency response community better by providing a summarized description of the basis for setting PAGs directly in the new publication. The 1992 PAG Manual Appendices are still available online in a word-searchable format, for reference.

The EPA received limited, but important, comments on the worker protection section of the proposed Manual, requesting updates to reflect more recent publications on worker safety. These

comments were considered by the EPA, the Occupational Safety and Health Administration and the NRC; changes were made to ensure consistency with the latest worker safety guidelines from other agencies.

Some commenters expressed concern over the removal of the 5 rem over 50 years Relocation PAG. Therefore, explanation about the removal of that PAG was expanded, adding language to better explain the deletion. The decision was made in order to eliminate confusion with long-term remediation timeframes and long-term cleanup goals.

The EPA received a number of comments, largely from environmental organizations, expressing concern about whether the PAGs are safe enough, and whether children and sensitive subpopulations are considered adequately. There is an abundant conservatism built into the derivation of the PAGs, and into the assumptions used to generate derived response levels, to ensure that the PAGs are appropriate emergency guides for all members of the public, including sensitive subpopulations. The Agency provided additional explanation in the revised Manual about the basis for the PAGs and how PAG levels are set. A discussion of the conservatism that has been built into the early and intermediate phase PAGs was also added to the Manual.

Some commenters expressed concerns that PAGs would weaken environmental standards and regulations. Environmental regulations or standards are legal limits designed to prevent health effects from everyday exposure to low levels of radiation over long periods. The PAG levels are guidance for emergency situations; they do not supplant any standards or regulations, nor do they affect the stringency or enforcement of any standards or regulations. The PAG levels are intended to be used only in an emergency when radiation levels have already exceeded environmental standards and could be high enough to cause health effects unless protective

actions are taken. The PAG levels trigger public safety measures to minimize or avoid radiation exposures during an emergency.

The EPA also received some comments suggesting that the U.S. should rely solely on existing environmental standards and that PAGs are not needed. PAG levels do not replace environmental standards, and environmental standards do not fulfill the role of the PAGs. PAGs are used only during emergency situations when radiation levels are already exceeding environmental standards and could become high enough to cause adverse health effects unless protective action is taken. During a radiological emergency, the PAGs are designed to prevent adverse health effects by triggering public safety measures – protective actions, such as evacuation – and minimizing unnecessary exposures. The PAGs are set at a level where the health risk from radiation exposure that could be avoided with protective action outweighs the risk associated with taking the safety measures, e.g., traffic accidents, trips and falls or anxiety associated with dislocation or the separation of family members.

Finally, the EPA received comments requesting edits to clarify, reword or reorder language in the PAG Manual. Based on those comments, a number of editorial changes were made to improve both the clarity and readability of the Manual.

E. What is the timeframe for implementation of this PAG Manual?

Emergency management and radiation protection organizations that use the PAGs in their emergency plans are encouraged to incorporate this updated guidance as soon as possible. This may entail training, as well as updating plans and procedures. Outreach and technical training will be conducted by the EPA, the FRMAC and interagency partners on the PAG Subcommittee.

The Federal Emergency Management Agency (FEMA) expects certain organizations associated with nuclear power plant operations to use the PAG Manual in developing their

emergency management plans. The FEMA plans to begin using the new PAG Manual during their evaluation of offsite response organizations around nuclear power facilities twelve months after the publication of this Notice in the *Federal Register*.

For further information and related guidelines, see the PAGs web page:

<http://www.epa.gov/radiation/protective-action-guides-pags>.

Dated: December 1, 2016.

Gina McCarthy,

Administrator.

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