

April 7, 2006

Rules Docket Clerk
Office of the General Counsel
Federal Emergency Management Agency
Room 840, 500 C Street, SW
Washington, D.C. 20472

Dear Sir or Madam:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am providing the following comments on the draft Department of Homeland Security (DHS) guidance on the "Application of Protective Action Guides (PAGs) for Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents."

NRC appreciates the difficulty of developing PAGs for RDD and IND incidents and commends DHS' Preparedness Directorate staff for successfully coordinating and developing a Federal interagency consensus document. These PAGs provide a very useful model for Federal, State and Local agencies in the development of emergency response guidance, for the three phases of response. NRC agrees that use of existing PAGs for the early and intermediate phases of a response, including the worker protection guides, published in the revised 1992 Environmental Protective Agency's (EPA's), "Manual of PAGs and Protective Actions for Nuclear Incidents," is appropriate for RDD and IND incidents.

When emergency situations arise which result in relocation of the affected population, the intermediate phase PAGs provide a de facto upper boundary condition under which the late phase will occur. Although it is recognized that certain areas may not be reopened for unrestricted release for long periods of time, the need to address the long-term use of critical infrastructure in the late phase can be addressed using optimization and restrictions. Optimization will provide a flexible approach in which a variety of dose and risk benchmarks may be identified by Federal, State, or other sources in order to establish appropriate remediation plans for protection of public health, safety and the environment.

Thank you for the opportunity to comment on these important guidelines. Additional general and specific comments on the draft PAGs are enclosed. If you have any additional questions or would like to discuss our comments, please do not hesitate to contact Dr. Cynthia Jones of my staff at 301-415-0298 or cgj@nrc.gov.

Sincerely,

/RA/

Roy P. Zimmerman, Director
Office of Nuclear Security and Incident Response

Enclosure:
As stated

cc: Craig Conklin, DHS

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cc: Craig Conklin, DHS

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Letter to Rules Docket Clerk, Office of the General Counsel, FEMA dated: April 7, 2006

SUBJECT: DRAFT DEPARTMENT OF HOMELAND SECURITY (DHS) GUIDANCE ON THE
“APPLICATION OF PROTECTIVE ACTION GUIDES (PAGS) FOR RADIOLOGICAL
DISPERSAL DEVICE (RDD) AND IMPROVISED NUCLEAR DEVICE (IND) INCIDENTS

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**U.S. NUCLEAR REGULATORY COMMISSION
COMMENTS ON DEPARTMENT OF HOMELAND SECURITY (DHS) GUIDANCE
ON APPLICATION OF PROTECTIVE ACTION GUIDES (PAGs)
FOR RDD AND IND INCIDENTS**

General Comments

- I. NRC agrees that use of existing PAGs for the early and intermediate phases, including the worker protection guides, published in the revised 1992 Environmental Protective Agency's (EPA's), "Manual of PAGs and Protective Actions for Nuclear Incidents," is appropriate for RDD and IND incidents.
- II. NRC agrees with the site-specific optimization process proposed for the late phase PAGs. We believe that when emergency situations arise which result in relocation of the affected population, the intermediate phase PAGs provide a de facto upper boundary condition under which the late phase will occur. While it is recognized that certain areas may not be reopened for unrestricted release for long periods of time, the need to address the long-term use of critical infrastructure in the late phase can be addressed using optimization and restrictions.
- III. The purpose of the guidance as stated in the supplementary information section is to "aid Federal decision makers in protecting the public and emergency responders from the effects of radiation during an emergency and to provide guidelines and a process for site cleanup." We recommend that this document (and other sections, including Appendix 1) also be directed to local authorities as well as Federal decisionmakers. We suggest rewording this clarification to say that these guidelines "...aid decision makers in protecting the public and emergency responders..."
- IV. One of the proposed changes from current operating plans and protocols for responding to a radiological incident is the assumption of Federal leadership by the DHS. However, Appendix 3, "Federal Implementation," does not provide an implementation plan for law enforcement coordination during terrorism incident response, including the management of on-scene actions by the Federal Bureau of Investigation and DHS immediately following an act of terror. This omission could potentially lead to confusion during a critical time when roles and responsibilities should be well defined for incident response. It is recommended that the roles and responsibilities of all Federal agencies be resolved for the final version of the PAGs.
- V. As stated in Appendix 4, the Department of Energy (DOE) is conducting the analyses to support the completion of operational guidelines for use with PAGs in each phase of recovery for both personal and real property that may be impacted by an RDD or IND incident. For the late phase, the proposed approach is that operational guidelines should be similar to those likely to define late phase goals, which are referenced as a fraction of the intermediate phase PAGs. These guidelines would, in effect, establish operational guidelines for release of real and personal property for responding to, or recovering from, an RDD or IND incident. We look forward to working with DHS, DOE, and the other agencies in developing these operations guidelines.

- VI. Consistent use of terminology and units of measure has a large impact in conducting emergency operations and in communicating across International, Federal, State, Tribal, and local domains. We recommend that consideration be given to using the proper units of measure and terminology throughout the PAGs. The unit dose “rem” is used improperly as “rems” in the guideline. Likewise, “radionuclides” would be more accurate than “radioisotope” in most cases. We suggest that the guidance use units of radiation dose described in 10 CFR 20.1004, where radiation units are given in both U.S. and System International (SI) measures (e.g., 1 rem = 0.01 sievert).
- VII. One change from the EPA early phase PAGs does require clarification. That is the change from the use of committed effective dose equivalent (CEDE) to the use of absorbed dose (rad) as described in the first footnote to Table 1B on page 186. Although there may be substantial merit in having the first responder take action based on absorbed dose during rescue operations, additional explanation is needed to justify the basis for this change (e.g., in a statement of consideration). Additional analysis may also be warranted to determine the conversion of absorbed dose to CEDE following the incident for exposed individuals.
- VIII. NRC recommends that lessons learned from the response to Hurricane Katrina should also be incorporated into all phases of the PAGs and optimization. Populations could be displaced for long periods of time. Some clarification is needed to recognize, that in each case, the resources available will have an impact on the degree of Federal cleanup.

Specific Comments

9. Section (a)(1), “Background on the Guidance,” page 175, should be modified to better indicate the role of Coordinating and Cooperating agencies under the National Response Plan (NRP). Certain radiological response actions may be delayed under the NRP for the purpose of crime scene preservation. During the initial phases of an RDD incident, the FBI is the Coordinating Agency.
10. Section (a)(2), “Characteristics of RDD and IND,” page 175, states: “An RDD poses a threat to public health and safety and the environment through the spread of radioactive materials....” We recommend that the wording be revised to state: “An RDD *may* pose a threat....” An RDD could pose a threat via the explosion to anyone standing near it, but the immediate health effects from exposure to the low radiation levels expected from an RDD would likely be minimal. The effects of radiation exposure would be determined by the amount of radiation absorbed by the body, the type of radiation, the distance from the radiation source to the individual, the means of exposure (skin absorption, inhalation or ingestion), and the length of time exposed.
11. Section (a)(2), “Characteristics of RDD and IND,” page 175, states: “In most plausible scenarios, the radioactive material would not result in acutely harmful radiation doses and the public health concern from the radioactive materials would likely focus on the chronic risk...” This statement may be confusing and recommend that this sentence be revised to state: “In most plausible scenarios, the radioactive material would not result in

acutely harmful radiation doses and the public health concern from the radioactive materials would likely focus on the *possible* chronic risk..." It cannot be said with certainty that there is a chronic risk, but rather that there is a possibility that such a risk may exist.

12. Section (a)(3), "RDD and IND Incidents v. Accidents," page 175, should be modified to better address the potential impacts of multiple competing events/incidents that could challenge first responders and supporting emergency resources across an operating domain or within the same locality.
13. The last paragraph in Section (a)(3) on page 175 should be modified to clarify the fact that RDD and especially IND incidents are not comparable to nuclear power plant (NPP) accidents in their source term release potential or emergency preparedness. Extensive analyses have shown that NPP accidents would follow certain accident progression sequences and systems and measures are in place to mitigate their effects, contrast, an RDD or IND incident has the potential for immediate and direct release and exposure.
14. Preface, (a), "Introduction," page 179, states: ". . .this document presents levels of radiation exposure at which the Federal Government recommends that actions be considered to avoid or reduce adverse public health effects from an RDD or IND incident." However, it should be clarified that the PAG levels represent decision points to balance risks from implementing the protective action strategy against possible risks from radiation exposure. A dose of 1 rem is not an adverse dose and is well below the known thresholds for acute effects. This section should be revised to clarify this statement.
15. Preface, (b)(1), page 179, states: "An RDD poses a threat..." We recommend that this be revised to state: "An RDD *may* pose a threat..."
16. Preface, (b)(3), page 179, discusses the differences between acts of terror and accidents and states that ". . .an RDD would likely be on the same order of magnitude as a nuclear power plant accident. . ." We recommend that this phrase be deleted because there is no clear basis for comparing RDD and a nuclear power reactor, and this analogy is therefore confusing.
17. Figure 1 on page 181 and Table 1 on page 182 should clarify the basis for differences in protective actions for controlling food and water. In Figure 1, food is identified in the central early phase while water is identified at the end of the early phase/beginning of intermediate phase. Table 1 has both food and water interdiction in the intermediate phase. Interdiction for surface water drinking supplies and food at harvest time should be in the early phase.
18. In the first paragraph on page 182 of Section (d)(2), the word "principle" should be changed to "principal."
19. Section (f)(iii), page 184. Although the 2 mR/hr radiation level is an example from 10 CFR Part 20 that can be used to show how operational levels can be developed for control of access, we do not believe that citing this regulation is appropriate when

discussing examples of operations guidelines for first responders and establishment of “hot zones.” We suggest referencing NCRP Report No. 138, “Management of Terrorist Events Involving Radioactive Material,” which recommends an ambient dose rate of 10 mR/hr as a suitable initial alarm level for first responders.

20. Appendix 1, (d), page 185, on maintaining exposures “As Low As Reasonably Achievable,” should be modified to reflect exposure controls in terms of total effective dose equivalent (TEDE) for the sum of internal and external exposures. Table 1B on page 186 should be modified to replace “data” with “dose” in referring to TEDE. In footnote 1 of Table 1B “does” should be changed to “doses.”
21. Appendix 1, Table 1B, page 186, should be modified to be consistent with Table 2-2 (page 2-10) of the current EPA PAG Manual, which distinguishes between doses up to 25 rem and doses greater than 25 rem (volunteer). Likewise, for an individual to volunteer to receive an acute dose as described Table 1C of the proposed PAGs for RDD and IND incidents, a more informed description of the initial symptoms, indicated medical treatment, and associated clinical indications is warranted. NRC recommends that medical aspects of radiation injury using a simplified version of NCRP Report No. 138, Appendix A , be more explicitly integrated into Table 1C.
22. Appendix 1, Table 1B, page 186, “Response Worker Guidelines” and Table 1C, “Acute Radiation Syndrome,” page 187, and the discussion that follows talk about deterministic effects and state that 25 rem should only be taken for lifesaving actions with an understanding of the possible risks. In Table 1C, it is clearly stated in the 0-100 rem column that there will be no effects. However, the discussion that follows in this section recommends that workers get a medical followup for any exposure in excess of 5 rem. This sends a contrary message as to the potential health effects at exposures between 5-100 rem and reassurance to workers. We recommend that this statement be revised to state that in the event of a RDD accident, additional medical followup *may* be provided. We also recommend that more context be provided for these tables. For example, it could be explained that the upper bound of 25 rem was established as a guideline because it was still well below the levels known for acute effects. However, this limit is still protective and allows for flexibility in emergency response efforts.
23. Appendix 1, footnote to Table 1B, page 186, states that special monitoring programs should be employed for workers that receive greater than 10 rem. To be consistent with the long-term medical study program, this should be changed to greater than or equal to 25 rem for the whole body, active blood-forming organs, or gonads; a dose greater than or equal to 600 rad to the skin or extremities; a dose greater than or equal to 75 rem to other tissues or organs from an external source; or dose greater than or equal to 50% of NCRP permissible body burden.
24. Appendix 1, (e) page 187, discusses the estimated risk of fatal cancer. We recommend that this statement be put into perspective. The paragraph states: “The estimated risk of fatal cancer for workers exposed to 10 rem is 0.6 percent (six cases per one thousand exposed).” We recommend adding the statement: “These are 6 additional cases to the expected 200 cancer fatalities per 1000 people.” A similar statement can be used for the 25 rem example.

25. Appendix 1, (f) "Incident Commanders and Responders Need Proper Training in Advance," page 187, should be highlighted in **bold** as in other sections.
26. Appendix 1, (f), page 187, states: "When the 5 rem guideline is exceeded, workers should be provided the following: training with the respect to the risk associated with exposure to ionizing radiation." This training should be provided to all workers, not just to workers that are expected to receive greater than 5 rem.
27. Appendix 1, Footnote 4, page 187. The word "concern" should be replaced with "cancer."
28. Appendix 1, Footnote 6, page 187, has an incorrect URL address. It should be: <http://www.nv.doe.gov/nationalsecurity/homelandsecurity/frmac/manuals.aspx>
29. Appendix 1, (g), page 188, "Occupational Standards," discusses OSHA's and NRC's radiation protection standards in two separate sections, with no explanation of the differences between the two. OSHA dose criteria for workers are cited [quarterly dose limit and a lifetime limit based on age using the following equation: lifetime limit = $5(N - 18)$, where N is age in years. The NRC regulations at 10 CFR Part 20 and the DOE regulations at 10 CFR Part 835 no longer use these criteria. We recommend that an explanation of the differences or a reference to using the 1987 Presidential Guidance for Occupational Exposure of 5 rem per year be provided. There is a potential problem for confusion as to which occupational limits apply during emergency response activities if support personnel from organizations which use the OSHA standards are mixed with NRC and DOE personnel. In addition, on July 28, 2005, the NRC sent a letter to OSHA containing comments on OSHA's resent Request for Information on occupational exposures. In this letter, the NRC noted that OSHA standards have not been updated to reflect the 1987 Presidential Guidance. The NRC urged OSHA to update its regulations to use the 1987 Presidential Guidance to be consistent with other Federal agencies.
30. Appendix 2, (a)(3), page 189, "Risk Management Framework," states, "Of course, the feasibility and cost-effectiveness of an option may change in the future as technology is improved or as society's values change." We recommend that the following words be added to the end of the statement: ". . .or as the effects of exposure to low levels of radiation is better understood."
31. Appendix 2, (b)(2), page 190, "Technical Peer Review Advisory Committee," should be modified to indicate that advisory committees will be formed and conducted in accordance with the Federal Advisory Committee Act (FACA). This section should also require that the advisory committees consist of persons having expertise in health physics/radiation protection, in addition to the various types of scientific expertise listed.
32. Appendix 4(b) on page 194 should identify the FRMAC manual more explicitly. There is more than one FRMAC manual with two volumes (both "Assessment" and "Monitoring and Analysis").

33. Appendix 5, "Acronyms/Glossary," page 196, should be modified to add that "NPP" stands for "nuclear power plant," or alternatively, spell out the phrase directly in the text.