HEALTH PHYSICS SOCIETY

# GUIDANCE FOR PROTECTIVE ACTIONS FOLLOWING A RADIOLOGICAL TERRORIST EVENT

## POSITION STATEMENT OF THE HEALTH PHYSICS SOCIETY*

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## INTRODUCTION

This position statement by the Health Physics Society provides recommendations for decision makers for protective actions in response to a radiological terrorist event.[1] The Society has also issued a **Background Information Paper** that provides information pertaining to the basis of these recommendations and additional information for implementing or using the recommendations. Both documents are necessary to fully understand the basis and conditions for these recommendations.

## POSITIONS

1. The Health Physics Society believes it is extremely unlikely that a radiological terrorist dispersal event (i.e., exclusive of detonation of a nuclear weapon) can disperse sufficient radioactive material for the resulting air and ground contamination to pose an immediate health hazard to people near the event or to first responders.

2. The Health Physics Society believes protective actions[2] and protective action guides[3] following a radiological terrorist event should be consistent with the existing federal guidance for nuclear incidents,[4] with appropriate accommodation of unique aspects of a terrorist event.

## RECOMMENDATIONS

1. Lifesaving actions and actions to secure the area of a radiological terrorist event from further terrorist activities should take precedence over radiological considerations following a radiological terrorist event, with the possible exception of the area near ground zero soon after detonation of a nuclear weapon.

2. During the *"early phase"*[5] (Note: It is unlikely that this phase will be applicable to a localized dispersal event like a "dirty bomb."[6]):

    a. Sheltering will normally be the preferred protective action until an orderly evacuation of the contaminated area can be made. Monitoring for contamination and applying decontaminating techniques should be performed prior to releasing people.

    b. Sheltering should be directed if the projected effective dose[7] (see Recommendation 5) is, or has the potential to be, greater than 10 mSv (1 rem). [8]

    c. Sheltering need not be implemented if the projected effective dose is less than 1 mSv (100 mrem).

    d. Evacuation of most population groups should be directed if it is more protective than sheltering, but not if the projected dose is less than 50 mSv (5 rem), with the following exception:

       For special groups for which evacuation puts them or the public at a greater risk (e.g., persons on medical life support, institutionalized criminals, etc.), evacuation should not be directed if the projected effective dose is less than 100 mSv (10 rem).

3. During the *"intermediate phase"*[9]:

    a. Decontamination and other dose-reduction techniques should be directed if the projected annual effective dose exceeds 5 mSv (500 mrem) for any year following the first year.

    b. Relocation of residents and closing of businesses should be directed if the projected annual effective dose is 20 mSv (2 rem) or greater for the first year, taking into account the projected effectiveness of the decontamination and other dose-reduction techniques initiated under recommendation 3.a.

    c. Control of human food and animal feeds should be in accordance with the Food and Drug Administration's "Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies" (US FDA 1998).

4. During the *"late phase (recovery)"*[10]:

    a. When the projected annual effective dose is less than 5 mSv (500 mrem) but greater than 1 mSv (100 mrem), the decision to continue decontamination and other dose-reduction techniques should be based on the principle that doses should be as low as reasonably achievable, taking into account social and economic issues.

    b. Decontamination and other dose-reduction techniques are generally not justified when the projected annual effective dose is less than 1 mSv (100 mrem).

5. Projected doses:

    a. Projected doses for comparison to the *"early and intermediate phase"* protective action guides are for a maximally exposed individual and the calculation methods should be consistent with those currently existing in the Environmental Protection Agency's "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents" (PAG Manual) (US EPA 1992) but should be based on the latest available dose conversion factors.

    b. Projected doses for comparison to the *"late phase (recovery)"* protective action guides are for a reasonable maximally exposed individual and the calculation method should use dose-assessment computer programs or methodologies accepted by federal agencies using realistic exposure scenarios for the intended actual use of the radioactively contaminated areas.

REFERENCES

US Environmental Protection Agency. Manual of protective action guides and protective actions for nuclear incidents. Washington, DC: USEPA; EPA 400-R-92-001; May 1992.

US Food and Drug Administration. Accidental radioactive contamination of human food and animal feeds: Recommendations for state and local agencies. 13 August 1998. Available at: http://www.fda.gov/cdrh. Accessed 16 January 2004.

FOOTNOTES

[1] For the purposes of this position statement a radiological terrorist event is defined as the intentional release of radioactive material to the environment or use of a source of radiation for the purpose of harming the health or safety of the public. It includes any type of device or method used to disperse radioactive material, including conventional explosive materials (i.e., a dirty bomb) and improvised nuclear weapons.

[2] A protective action is defined as an intervention (which will usually disrupt normal living) that must be taken to protect the public during a nuclear incident when the source of exposure of the public is not under control.

[3] A protective action guide is defined as the projected dose to reference man, or other defined individual, from an unplanned release of radioactive material for which a specific protective action to reduce or avoid that dose is recommended.

[4] A nuclear incident is defined as an event or a series of events, either deliberate or accidental, leading to the release, or potential release, into the environment of radioactive materials in sufficient quantity to warrant consideration of protective actions.

[5] The early phase (also referred to as the emergency phase) is the period at the beginning of a nuclear incident when immediate decisions for effective use of protective actions are required and must therefore be based primarily on the status of the incident and the prognosis for worsening conditions.

[6] A dirty bomb is a dispersal device that uses a conventional explosive material to attempt to spread a source of radioactive material in the environment.

[7] The effective dose is a quantity developed by the International Commission on Radiological Protection (1991) for purposes of radiation protection. The effective dose is assumed to be related to the risk of a radiation-induced cancer or a severe hereditary effect. It takes into account (1) the absorbed doses that will be delivered to the separate organs or tissues of the body during the lifetime of an individual due to intakes of radioactive materials, (2) the absorbed doses due to irradiation by external sources, (3) the relative effectiveness of different radiation types in inducing cancers or severe hereditary effects, (4) the susceptibility of individual organs to develop a radiation-related cancer or severe hereditary effect, (5) considerations of the relative importance of fatal and nonfatal effects, and (6) the average years of life lost from a fatal health effect.

[8] The sievert (Sv) is the special name for the international (SI) unit of effective dose. The Society endorses the use of SI units; however, because US regulatory agencies continue to use traditional units in regulations, this position statement also gives the effective dose in rem, which is the special name for the traditional unit. The millisievert (mSv) and millirem (mrem) are one one-thousandth of a sievert and rem, respectively (100 mrem = 1 mSv).

[9] The intermediate phase is the period beginning after the source and releases have been brought under control and reliable environmental measurements are available for use as a basis for decisions on additional protective actions.

[10] The late phase (also referred to as the recovery phase) is the period beginning at commencement of recovery action designed to reduce radiation levels in the environment to acceptable levels for unrestricted use and ending when all recovery actions have been completed.

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* The Health Physics Society is a nonprofit scientific professional organization whose mission is excellence in the science and practice of radiation safety. Since its formation in 1956, the Society has grown to approximately 6,000 scientists, physicians, engineers, lawyers, and other professionals representing academia, industry, government, national laboratories, the Department of Defense, and other organizations. Society activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Society members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits. Official position statements are prepared and adopted in accordance with standard policies and procedures of the Society. The Society may be contacted at 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101; phone: 703-790-1745; fax: 703-790-2672; email: HPS@BurkInc.com.