



**Designation: E2601 – 23**

## **Standard Practice for Radiological and Nuclear Emergency Response<sup>1</sup>**

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### **INTRODUCTION**

Terrorist attacks around the world, including the attacks of September 11, 2001, and the continued proliferation of nuclear weapons bring the recognition that weapons of mass destruction (WMD), including the threats posed by radiological and nuclear weapons, remain a relevant concern. Since the attacks of 2001 and subsequent expressions of interest in acquiring radiological or nuclear weapons, or both, by terrorist groups and nation states, many jurisdictions have recognized the need for radiological and nuclear emergency preparedness. Incident response is still based on accepted procedures and safe work practices developed over the years, but it has become the norm to plan for both accidents and an intentional release of hazardous materials (including radioactive materials) designed to kill or injure, to cause destruction of property, or to deny access to areas, or combinations thereof. This practice provides guidance for the initial response to any type of incident complicated by radiation, and the basic radiation principles described will enable responders to perform their duties to save lives, protect the public and minimize radiation dose in keeping with the ALARA principle; however, this practice is not intended to replace the large body of work that has already been developed that addresses responses to accidents at commercial nuclear power plants, nuclear detonations, or large-scale radiological incidents and those that are included in the list of references.

This practice provides decision making considerations that jurisdictions can use to respond to incidents that involve radiological or nuclear materials. This practice also provides a consistent set of practices that can be incorporated into the development, planning, training, and implementation of guidelines for radiological emergency response. While the practice does not fully treat the complexities of large-scale radiological (for example, a radiological attack) or nuclear (for example, a nuclear attack) incidents, or commercial nuclear power plant (NPP) accidents, it refers jurisdictions to recent guidance documents and practices to incorporate into their own procedures for an initial response, with the assumption that concurrent requests are made to summon specialized regional, state, and federal radiological expertise and equipment, as appropriate to the incident. This practice does not incorporate intermediate or long-term recovery or mitigation considerations.

The following are key concepts associated with this practice:

- This practice applies to the initial response to an incident, which begins with the recognition of the radiological or nuclear nature of the incident and ends when emergency response actions cease or the response is supported by specialized regional, state, or federal response assets (if requested).
- In the first hours of the response, it is unlikely that significant levels of federal and state support will be on scene. This means that State, Local, Tribal, and Territorial (SLTT) jurisdictions and agencies must rely on their own immediately available assets, technical equipment, and training.
- This practice recognizes that response to all radiological incidents calls for assessing the risks to responders to determine whether the prospective benefit(s) justify an offensive mode of operations, and that response to a nuclear detonation calls for immediate sheltering for all emergency responders who do not have radiation detection equipment available;
- It adheres to a risk-based response; this means the guidance presented is intended to be coupled with the authority having jurisdiction's (AHJ) understanding of local hazards, vulnerabilities, and capabilities when developing its plans and guidance documents on the subject;
- It is compliant with the National Incident Management System (NIMS) and uses Incident Command System (ICS) common terminology. Full compliance with NIMS is recognized as an essential part of emergency response planning;
- It uses plain language: in developing this practice, every effort was made to ensure that the text,

including definitions, is presented in plain language according to Ref (1);<sup>2</sup>

- It acknowledges that response to a nuclear incident is far more complex than a radiological response and will require a different level of effort, time, and available resources to resolve;
- It notes that only a nuclear detonation requires responders to immediately seek shelter (if they have radiation detection instruments), to conduct only quick, critical lifesaving activities outside in areas where radiation exposure rates are greater than 10 R/h (if they have radiation instruments) or, if without radiation instruments, to remain in shelter until they are instructed to respond or relocate by an appropriate person in their chain of command (X4.2.2);
- While the dose accrued in an emergency is not subject to regulatory requirements and it is desirable to keep below 5 rem, in an emergency this may not be possible. This standard recognizes the dose in an emergency is managed under the Environmental Protection Agency guidance described in Section 4 and not by occupational limits. In addition to the Environmental Protection Agency guidance, there are numerous supporting references in this practice to implement that guidance, as cited in the paragraph below. In addition, Chapter 7 in Ref (2) contains a comprehensive discussion on the status of emergency workers with regulations and guidance (1);
- It is consistent with other planning guidance documents such as: Refs (2-6);
- It is intended to complement existing guidance (for example, Ref (7)) but it is not intended to replace existing guidance for responding to commercial nuclear power plant accidents. The state of preparedness for communities in close proximity to nuclear power plants far exceeds the minimum requirements and capabilities described in this practice; and
- It emphasizes the importance of working with or consulting with radiation safety professionals throughout the process of incorporating the contents of this practice into radiological and nuclear emergency response plans.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee E54 on Homeland Security Applications and is the direct responsibility of Subcommittee E54.01 on CBRNE Detection and CBRN Protection.

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<sup>2</sup> The boldface numbers in parentheses refer to a list of references at the end of this standard.

## 1. Scope

1.1 This practice provides decision-making considerations for response to both accidental and intentional incidents that involve radioactive material. It provides information and guidance for what to include in response planning and what activities to conduct during a response. It also encompasses the practices to respond to any situation complicated by radiation in conjunction with the associated guidance for the specific type of incident.

1.1.1 The intended audience for the standard includes planners as well as emergency responders, incident commanders, and other emergency workers who should be protected from radiation.

1.1.2 The scope of this practice applies to all types of radiological emergencies. While it does not fully consider response to an NPP accident,<sup>3</sup> an explosive RDD, or nuclear detonation, detailed guidance to respond to such incidents is provided in other documents, such as those cited in the introduction. With respect to the guidance documents, this practice provides the general principles that apply to the broad range of incidents and associated planning goals but relies on the AHJ to apply and tailor their response planning based on those documents as well as the limitation of the personnel and equipment resources in the jurisdiction. In addition, the AHJ should use those documents to identify improvements to

planning and resources to be better prepared for the more complex emergencies.

1.1.3 This practice does not expressly address emergency response to contamination of food or water supplies.

1.1.4 The Emergency Response Guide (ERG) published by the Department of Transportation provides valuable information for response to traffic accidents involving radioactive materials. For other radiological or nuclear incidents, however, the ERG may not provide adequate information on appropriate protective measures and should not be the sole resource used.

1.2 This practice applies to those emergency response agencies that have a role in the response to an accidental or intentional radiological or nuclear incident. It should be used by emergency response organizations such as law enforcement, fire service, emergency medical services, and emergency management.

1.3 This practice assumes that implementation begins with the recognition of a radiological or nuclear incident and ends when emergency response actions cease or the response is supported by specialized regional, state, or federal response assets.

1.4 AHJs using this practice should identify hazards, develop a plan, acquire and track equipment, and provide training consistent with the descriptions provided in Section 6.

1.5 While response to radiological hazards is the focus of this practice, responders must consider all hazards during a response; it is possible that non-radiological hazards may

<sup>3</sup> Local response to nuclear facility incidents should follow nuclear facility plans.