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SAFETY AND HEALTH TOPICS

Radiological Dispersal Devices (RDD)/ Dirty Bombs



Introduction

Radiological dispersal devices (RDD), also known as "dirty bombs," consist of radioactive material combined with conventional explosives. They are designed to use explosive force to disperse the radioactive material over a large area, such as multiple city-blocks. Around the world, there are many sources of radioactive material that are not secure or not accounted for. Rogue nations and/or terrorist groups can obtain these materials for dirty bombs. These explosive weapons may initially kill a few people in the immediate area of the blast but are used primarily to produce psychological rather than physical harm by inducing panic and terror in the target population. Their use would also result in costly cleanup for decontamination.

The following questions link to information relevant to radiological dispersal devices (RDD)/dirty bombs.

- [OSHA Compliance](#)
- [How will clean-up workers be protected?](#)
- [Related Safety and Health Topics Pages](#)
- [What are dirty bombs and how are they hazardous?](#)
- [How will workers in the surrounding area be protected?](#)
- [How will first responders be protected?](#)
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- [What organizations and authorities are involved in RDD response?](#)
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OSHA Compliance

Standards

- General Industry ([29 CFR 1910](#))
 - [1910 Subpart H](#), Hazardous material [[related topic page](#)]
 - [1910.120](#), Hazardous waste operations and emergency response (HAZWOPER). Contains requirements relating to ionizing radiation at hazardous waste sites. [[related topic page](#)]
 - [1910 Subpart Z](#), Toxic and hazardous material [[related topic page](#)]
 - [1910.1096](#), Ionizing radiation [[related topic page](#)]
- Construction Industry ([29 CFR 1926](#))
 - [1926 Subpart D](#), Occupational health and environmental controls
 - [1926.65](#), Hazardous waste operations and emergency response (HAZWOPER). Contains requirements relating to ionizing radiation at hazardous waste sites.

Federal Register

US Department of Homeland Security (DHS)

- [Planning Guidance for Protection and Recovery Following Radiological Dispersal Device \(RDD\) and Improvised Nuclear Device \(IND\) Incidents](#) [187 KB PDF, 20 pages]. Federal Emergency Management Agency (FEMA), Notice 45029-45048, (2008, August 1).

Directives

- [OSHA Coverage of Ionizing Radiation Sources Not Covered by Atomic Energy Act of 1954](#). STD 01-04-001 [STD 1-4.1], (1978, October 30).
- [Memorandum of Understanding Between the OSHA and the U.S. Nuclear Regulatory Commission](#). CPL 02-00-086 [CPL 2.86], (1989, December 22). Delineates the authorities, responsibilities, and other activities between OSHA and NRC for occupational health and safety at radiation sites.
- Search all available [directives](#).

Standard Interpretations

- [Definition of an airborne radioactivity area](#). (1992, October 6).
- [Application of 1910.120 to cleanup of nuclear and hazardous waste](#). (1990, April 4).
- [Clarification of the jurisdiction's of OSHA and the NRC in nuclear power plants](#). (1987, January 8).
- [OSHA/NRC Interface Activities and Related Information](#). (1985, January 15).

Contents

- [OSHA Compliance](#)
- [Protecting Clean-up Workers](#)
- [Related Topics](#)
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- [Review of permissible radiation exposure levels](#). (1984, November 5).
- [Respirator air quality standards do not apply where the NRC has jurisdiction](#). (1979, March 6).
- Search all available [standard interpretations](#).

How will clean-up workers be protected?

- [Hazardous Waste](#). OSHA Safety and Health Topics Page.
- [Ionizing Radiation](#). OSHA Safety and Health Topics Page.

Related Safety and Health Topics Pages

- [Ionizing Radiation](#)
- [Emergency Preparedness and Response](#)

What are dirty bombs and how are they hazardous?

- [Fact Sheet on Dirty Bombs](#). US Nuclear Regulatory Commission (NRC), (2002, July). Includes the following subsections: Background, Impact of a Dirty Bomb, Sources of Nuclear Material, Control of Nuclear Material, Increased Security of Nuclear Material, Response to a Dirty Bomb, and Federal Role.
- [Frequently Asked Questions \(FAQs\) About Dirty Bombs](#). Centers for Disease Control and Prevention (CDC), Emergency Preparedness & Response.

How will workers in the surrounding area be protected?

- [Guidance for Protective Actions Following a Radiological Terrorist Event](#) [99 KB PDF, 4 pages]. Health Physics Society (HPS), (2004, January). A position statement from the Health Physics Society, a nonprofit scientific professional organization whose mission is to promote the practice of radiation safety.
 - [Background Information on "Guidance for Protective Actions Following a Radiological Terrorist Event."](#) [164 KB PDF, 12 pages] (2004, January). . Provides background information on the position statement listed above.

How will first responders be protected?

- Working Group on Radiological Dispersal Device (RDD) Preparedness. US Department of Homeland Security (DHS), Medical Preparedness and Response Sub-Group, (2003, May 1). Medical treatment of radiological casualties.
- Example Safety and Health Plans
 - [Radiological Emergency Response Team](#). Environmental Protection Agency (EPA). Responds to emergencies involving releases of radioactive materials from incidents at nuclear power plants, to transportation accidents involving shipments of radioactive materials, to deliberate acts of nuclear terrorism.
 - US Department of Defense (DoD)
- Survey instrumentation and personal monitoring
- Personal Protective Equipment (PPE)
- Decontamination
- Medical Surveillance
- Key Elements of Preparing Emergency Responders for Nuclear and Radiological Terrorism. National Council for Radiation Protection & Measurements (NCRP) Commentary 19, (2005).

How will health care workers be protected?

- [Medical Management of Radiological Casualties Handbook, Second Edition](#). Military Medical Operations Office, Armed Forces Radiobiology Research Institute, (2003, April). Also available as a 979 KB PDF, 168 pages. A supplement to the Medical Effects of Ionizing Radiation Course, offered by the US Department of Defense for training health-care professionals in the management of uncontrolled ionizing radiation exposure.
- [Initial Management of Irradiated or Radioactively Contaminated Personnel](#) [4 MB PDF, 40 pages]. US Department of the Navy, Bureau of Medicine and Surgery, (2003, September 26). Provides direction to the Medical Department, civilian medical personnel of the naval services and Navy and Marine Corps commands for the initial exposure assessment, management, and treatment of individuals who are irradiated or externally or internally radioactively contaminated.

What organizations and authorities are involved in RDD response?

- [OSHA](#)
- [Federal Radiological Monitoring and Assessment Center \(FRMAC\)](#). US Department of Energy (DOE). Gathers radiological information such as plume and deposition predictions, air and ground concentrations, exposure rates and dose projections, assurance of data quality, and current meteorological conditions and weather forecasts. FRMAC provides the results of the data collection, sample analysis, evaluations, assessments, and interpretations to the key decision makers in the affected areas of the emergency.
 - [Federal Radiological Monitoring and Assessment Center \(FRMAC\) Overview and Mission](#). Deploys as a phased response. The [Consequence Management Response Team \(CMRT I\)](#) is "prepared for deployment" within 4 hours after activation; [CMRT II](#) deploys within 12 hours of activation, and additional personnel and equipment for [CMRT Augmentation](#) is underway within 24 hours of activation. With the phased response, DOE assets will be activated and deployed depending upon the real or potential impact of the emergency.
- [US National Response Team \(NRT\)](#)
 - [Reconciling Coordination Issues Between the Federal Radiological Emergency Response Plan and the National Oil and Hazardous Substances Pollution Contingency Plan](#) [63 KB PDF, 11 pages]. (2002, October 24). Discusses the relationship between the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the Federal Radiological Emergency Response Plan (FRERP) in the event of a radiological response.
 - [National Response Center](#)
- [Environmental Protection Agency \(EPA\)](#)
 - [Radiation Emergency Response](#). Prepares for and responds to emergencies involving radioactive materials. In the event of a radiological emergency, EPA's Radiological Emergency Response Team (RERT) works with other federal agencies, state and local governments, and international organizations to monitor, contain, and clean up the release while protecting people and the environment from harmful exposure to radiation.
- [US Department of Justice \(DoJ\)](#)
- [US Department of Defense \(DOD\)](#)
 - [Air Force](#)
 - [Army](#)

- [Coast Guard](#)
- [Marines](#)
- [Navy](#)
- Local Government

What can be done to secure radioactive materials?

- [Summary of Report on Protection Against Nuclear Terrorism](#). International Atomic Energy Agency (IAEA), (2001, November 30). Press release on the state of security in various nuclear facilities. Indicates that in many cases there is a need for improved protection and control.
- [Reducing the Threat of Nuclear Theft and Sabotage](#) [84 KB PDF, 18 pages]. International Atomic Energy Agency (IAEA). Recommends a range of specific steps to upgrade security at individual facilities and strengthen national and international standards.
- [Inadequate Control of World's Radioactive Sources](#). International Atomic Energy Agency (IAEA) Press Release, (2002). Discusses the availability of the radioactive materials needed to build a "dirty bomb" and the lack of control and monitoring programs for known radioactive sources.
- [Reducing the Nuclear Threat in the 21st Century](#) [42 KB PDF, 8 pages]. International Atomic Energy Agency (IAEA), (2001, October 29). Discusses possible nuclear threats and measures to prevent them.
- [State and Federal Action is Needed for Better Control of Orphan Sources](#) [110 KB PDF, 2 pages]. Health Physics Society (HPS), (2002, April). Provides recommendations regarding orphan sources-radioactive sources that have escaped institutional control, such as, sources that have been lost, stolen, or abandoned.
- [Background Information on "State and Federal Action is Needed for Better Control of Orphan Sources."](#) [193 KB PDF, 6 pages] Health Physics Society (HPS), (2002, April).
- [Professional Society of Radiation Specialists Supports Radioactive Source Legislation](#) [96 KB PDF, 2 pages]. Health Physics Society (HPS), (2002). Presents the HPS position on proposed radioactive source legislation.
- [Guarding Nuclear Reactors and Materials from Terrorists and Thieves](#). Arms Control Association (ACA), (2001, October). Promotes more stringent physical protection standards for nuclear materials.

Additional Information

- [Blast Injuries: Radiological Dispersal Devices and Radiation Injury](#). Centers for Disease Control and Prevention (CDC), (2008, September 24). Provides information on the following topics: triage and staff protection, decontaminating the injured, diagnosis and treatment, and radiation-related illness/injury.
- [Prussian Blue \(ferric hexacyanoferrate \(II\)\) for Treatment of Internal Contamination with Thallium or Radioactive Cesium](#). US Food and Drug Administration (FDA), Center for Drug Evaluation and Research (CDER), (2003, October 3). FDA Approves use of Prussian Blue for Treatment of Internal Contamination with Thallium or Radioactive Cesium.
- [Radiological Dispersal Devices: Assessing the Transnational Threat](#). National Defense University (NDU), (1998, March). Examines threat and differentiates the physical from the psychological impact on a targeted population.
- [Dirty Bombs: Response to a Threat](#). Federation of American Scientists (FAS), (2002, April). Provides background, case studies, and recommendations regarding dirty bombs.
- [IAEA Action Plan to combat nuclear terrorism](#). International Atomic Energy Agency (IAEA). Introduces the IAEA action plan designed to upgrade worldwide protection against acts of terrorism involving nuclear and other radioactive materials. Also includes links to other related information.
- [Management of Terrorist Events Involving Radioactive Material](#). National Council for Radiation Protection & Measurements (NCRP) Report No. 138, (2001). Provides information and recommendations regarding the radiological health and safety issues related to the threat of terrorist activities involving radioactive material.
- [Protecting people against radiation exposure in the event of a radiological attack](#). International Commission on Radiological Protection (ICRP), (2005).
- [Protective Action Guides](#). Environmental Protection Agency (EPA).
 - Manual of Protective Action Guides and Protective Actions for Nuclear Incidents. 400-R-92-001, (1991, July).

Accessibility Assistance: Contact the OSHA Directorate of Technical Support and Emergency Management at (202) 693-2300 for assistance accessing PDF materials.

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